

Chemical Age

Birthday Honours
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VOL. 83 No. 2136

18 June 1960

THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

NATURE'S CATALYSTS (4)



The First Cheese

The origin of cheese-making is lost in antiquity. Legend has it that an Arabian merchant preparing for a long journey poured some milk into his water-bottle, which was made from the dried stomach of a sheep.

He travelled through the heat of the day, and in the evening paused to drink. To his amazement, only a thin watery liquid came from the bottle, and within he found a mass of white curd. The enzyme rennin in the sheep's stomach had produced curds and whey from the milk.

The early man-made catalysts were also discovered by chance, but today the theory of catalysis is more fully understood, and the research laboratories of I.C.I. are playing a prominent part both in this field and in the practical development of new and improved catalysts for industrial processes. Full information on I.C.I. CATALYSTS is available on request.

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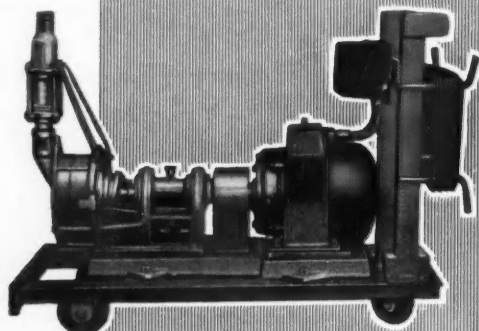
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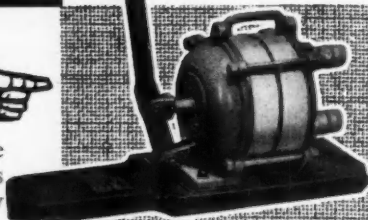
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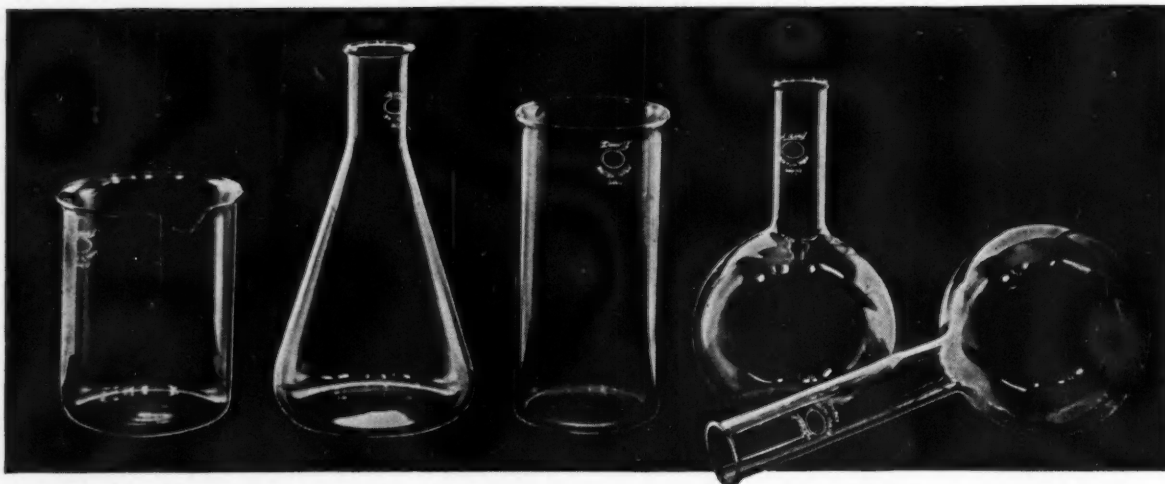
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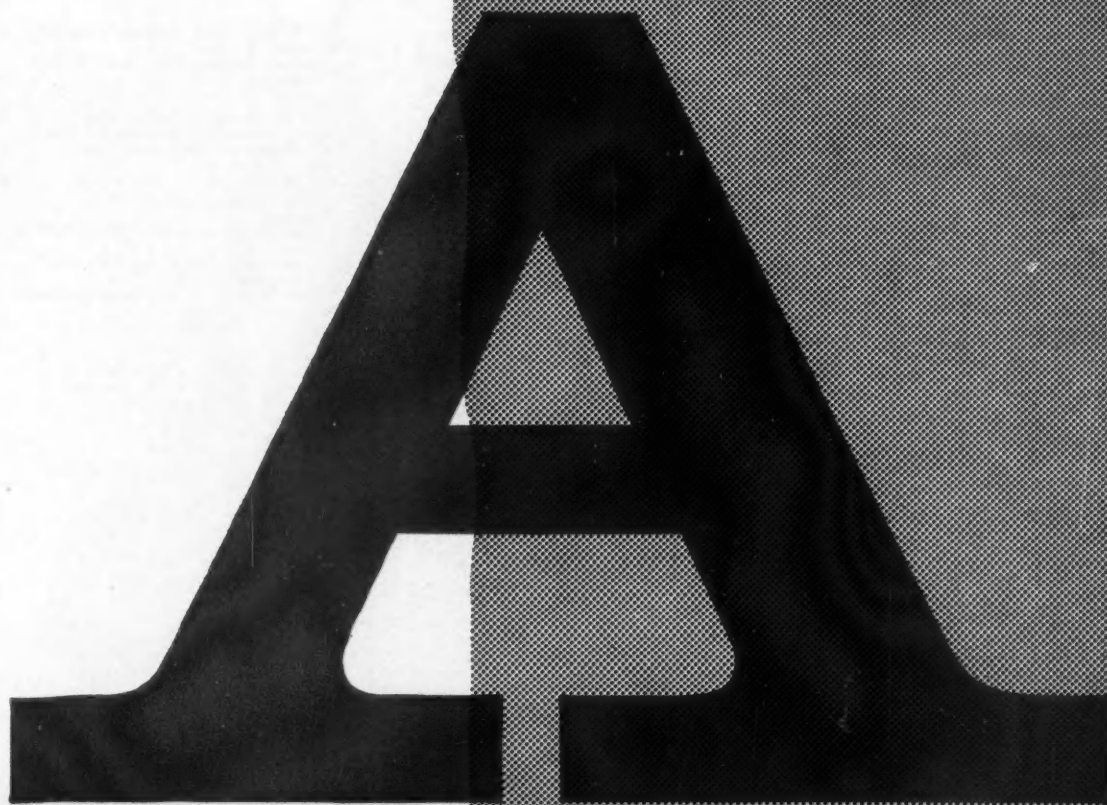
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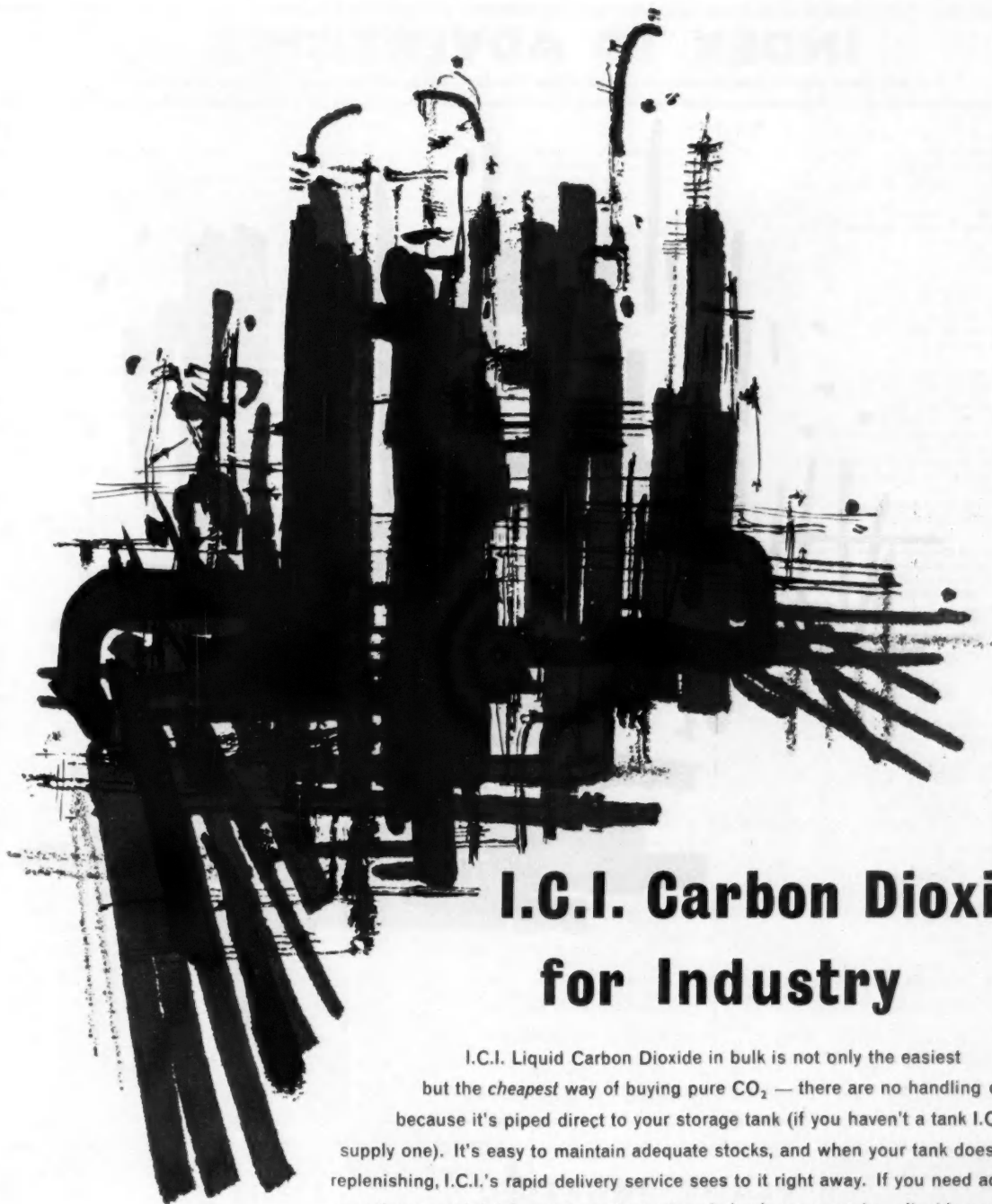
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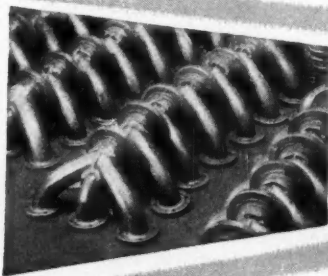
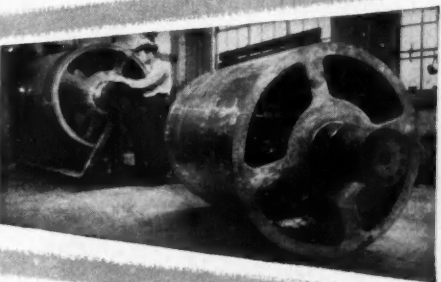
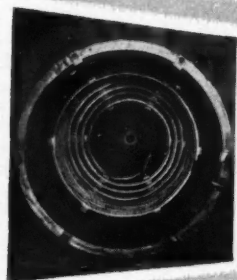
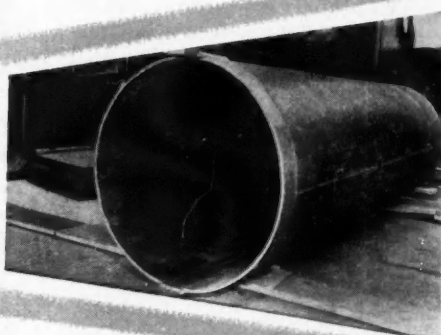
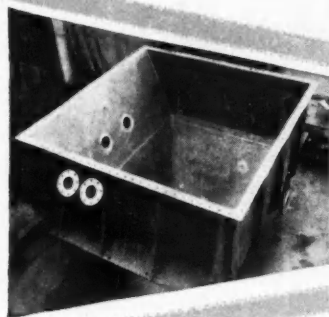
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LURGI

Modern technical planning requires new and economical working methods. Amongst these, electronic computers and scale models are welcome aids to the project engineer in connection with the planning, design and construction of equipment and complete plants for the chemical industry and related industries.

The method of using models is demonstrated by the illustrated Benzole Fractionation Plant which was built by Lurgi and which is a true representation of the self-made layout model. The process applied in the plant for the recovery of chemically pure benzole, toluene and xylene has been developed in Lurgi's own research laboratories.

The Lurgi companies are using all such new working methods for their layout studies wherever this is feasible and preferable.

Lurgi is presently handling the design and construction of processing units and complete plants in more than 30 countries of the world covering the following process fields:

Preparation of iron ore and non-ferrous ores for metallurgical treatment

Recovery of metals in individual plants and complete smelters

Production of sulphuric acid

Production of fertilizers

Gasification of solid and liquid fuels including recovery of valuable byproducts

Production of semi-coke

Refining of petroleum and mineral oils

Production of basic products for the manufacture of plastics

Special processes for the cellulose and rayon industry

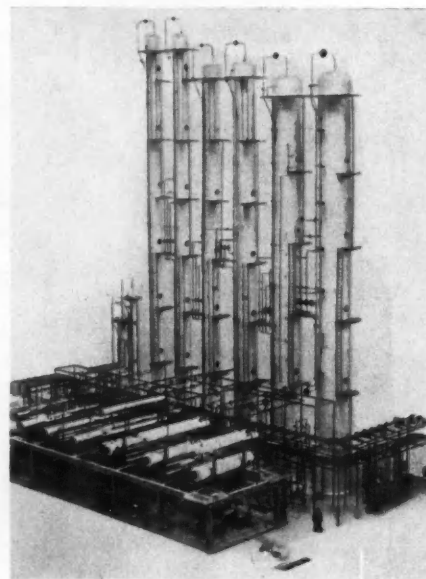
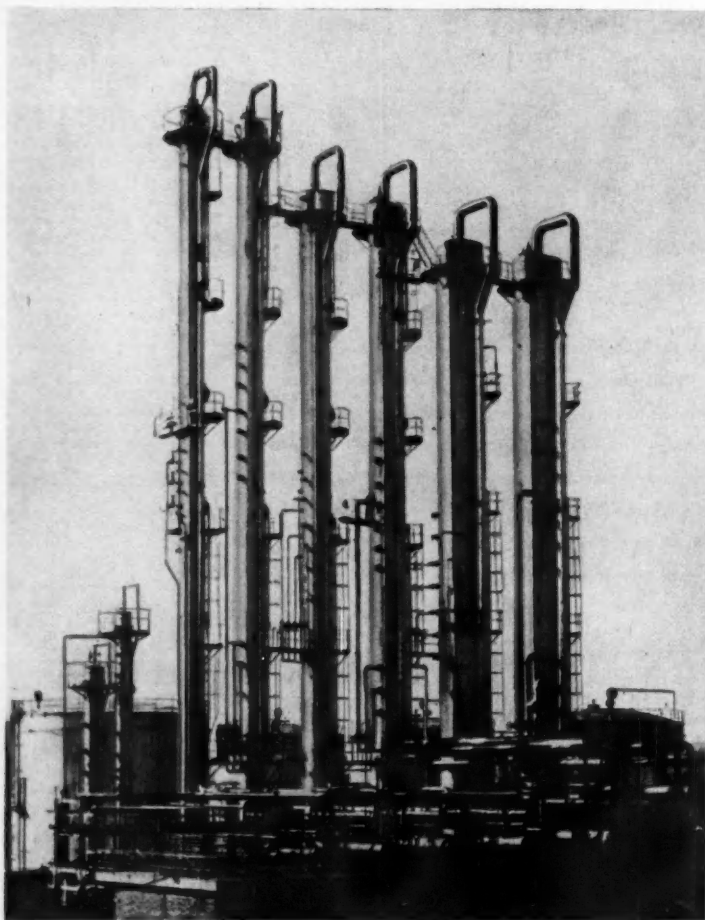
Dedusting and purification of industrial waste gases

Water and waste treatment

Extraction and refining of vegetable oils and fats

Vacuum evaporation of inorganic and organic solutions

Spray drying for the manufacture of detergents.



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LURGI COMPANIES • FRANKFURT AM MAIN

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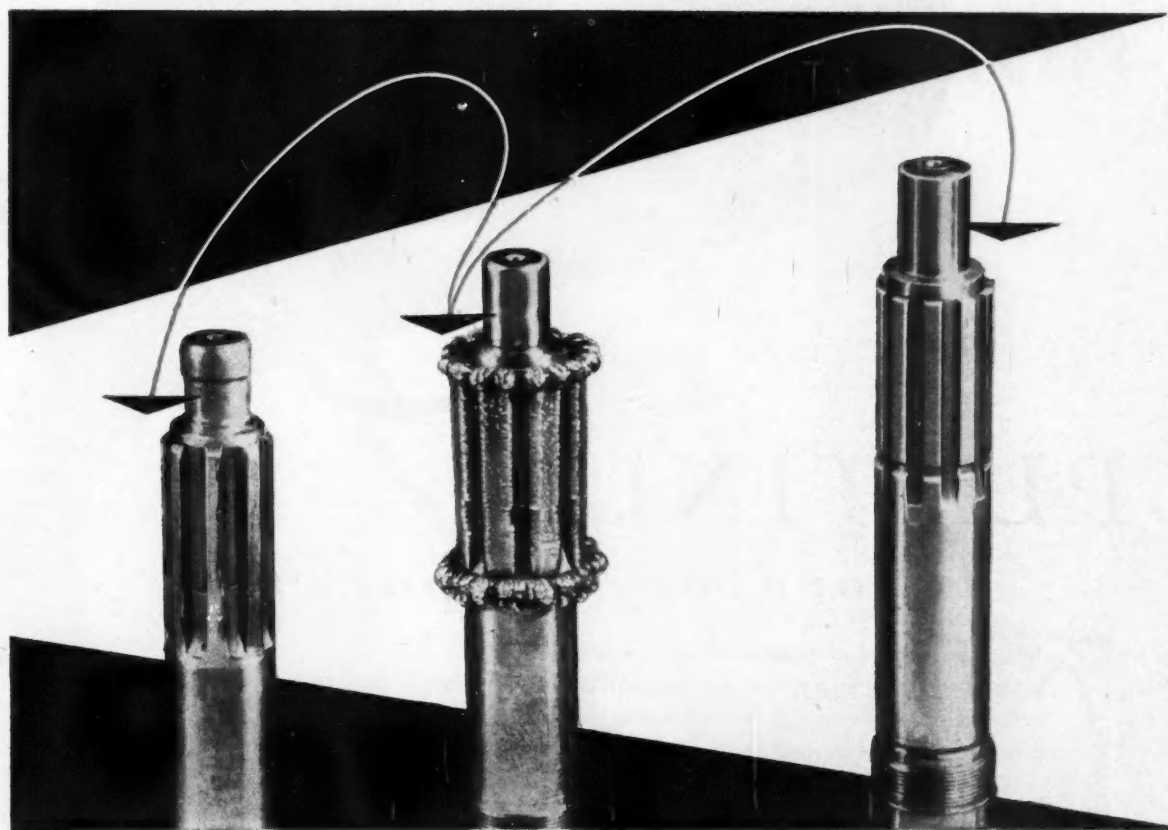
Mond Nickel Salts are used in the 'Fescol'* process of electrodepositing nickel on components that have been worn down in service. The worn areas are first machined true, built-up with nickel beyond the finished dimensions and then ground back to size.

After this treatment the component can be expected to have a longer life than a new spare part.

Mond Nickel Salts are to be found in nearly every electroplating solution.

Other Mond Chemicals are used by the manufacturers of paint, varnish and ink, pottery, vitreous enamels, plastics and glass; by the refiners of petroleum and oil and by farmers for animal nutrition.

Extensive technical data is available and your enquiries are invited on the compounds and elements listed here.



Three stages in the 'Fescol'* process: left the worn component,
centre the component deposited with nickel,
right the component ground back to its correct dimensions.



THE MOND NICKEL COMPANY LIMITED

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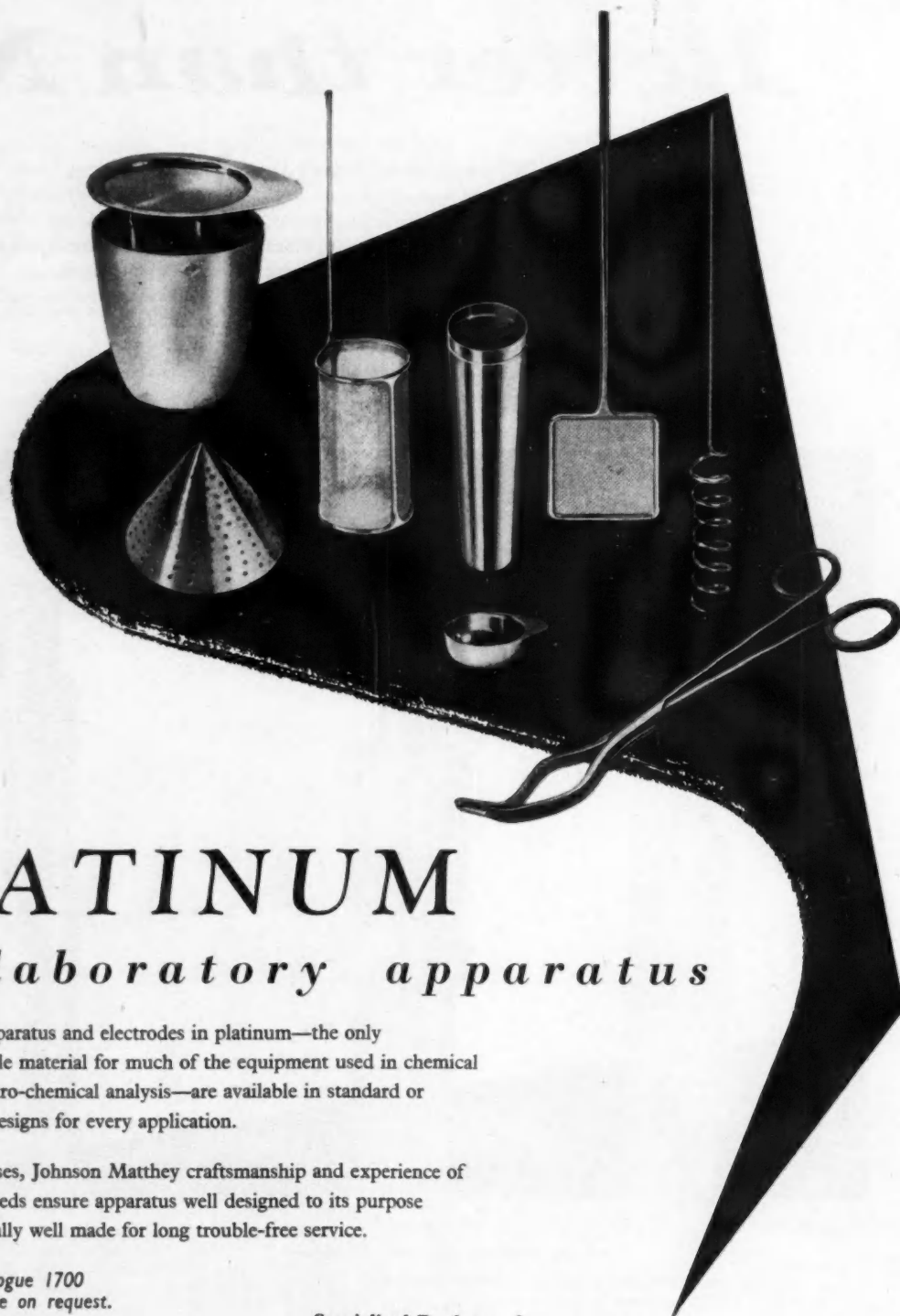
NICKEL : Oxides—Sulphate—Ammonium
Sulphate—Nitrate—Acetate—Chloride—Formate
—Carbonate—Hydrate

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SELENIUM : Metallic powder, Selenium
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* 'Fescol' is the registered trade mark of Fescol Limited, London, N 7



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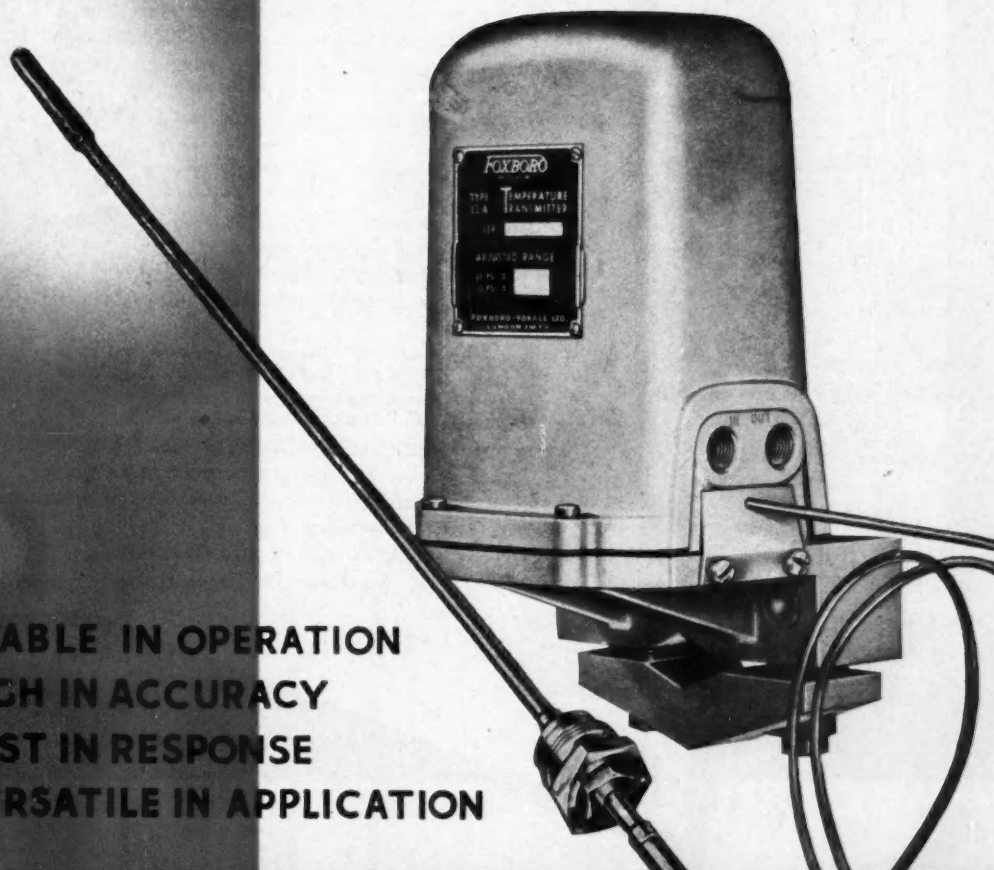
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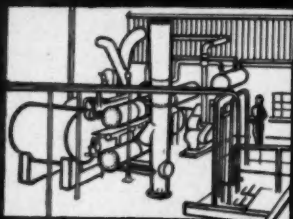
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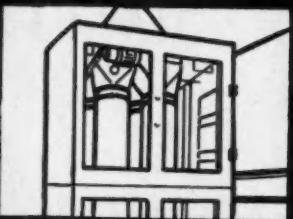
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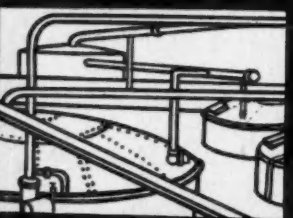
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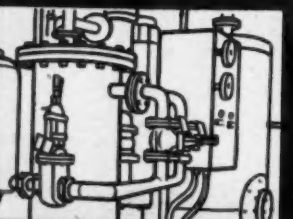
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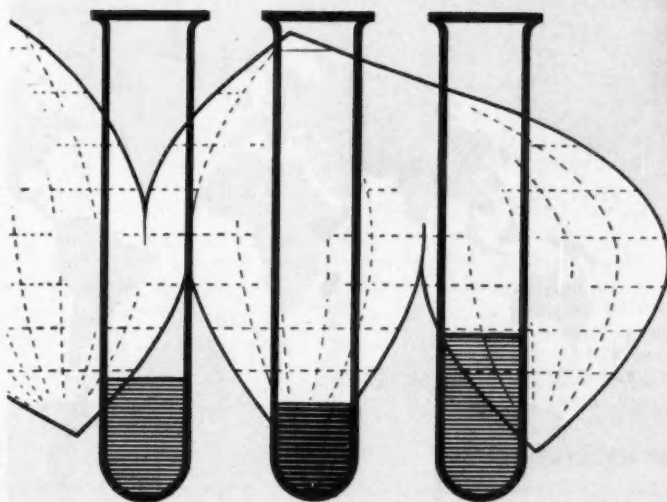
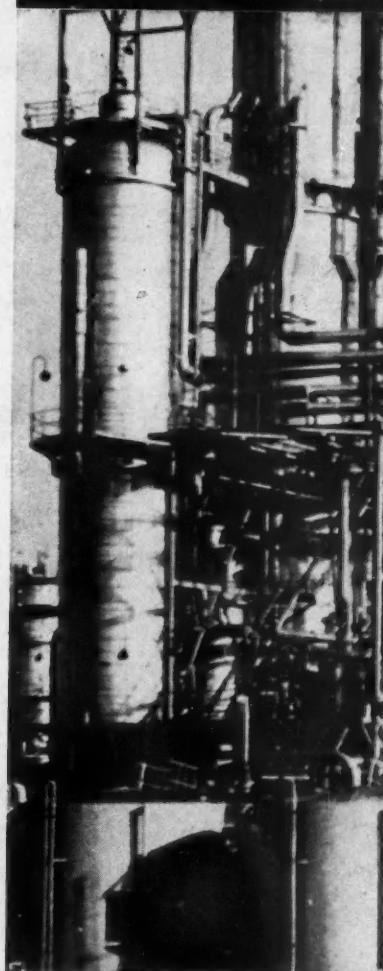
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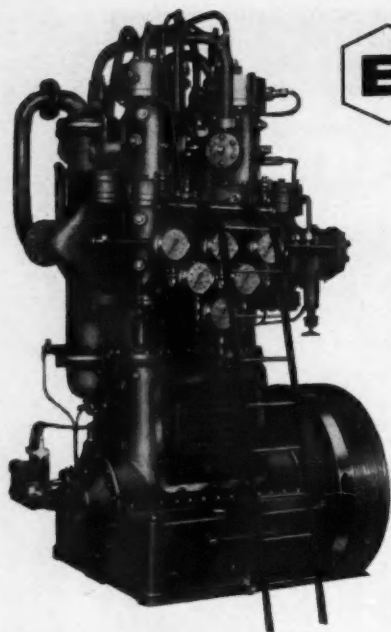


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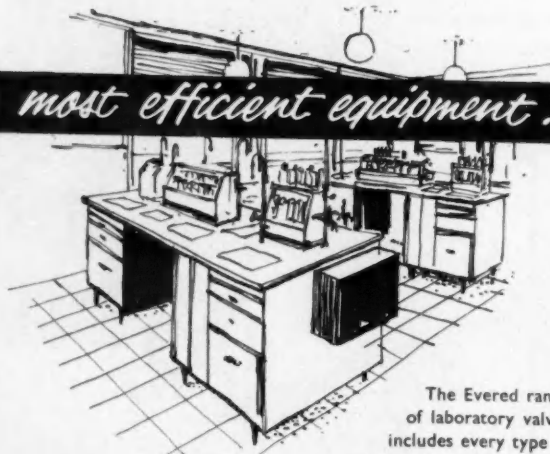
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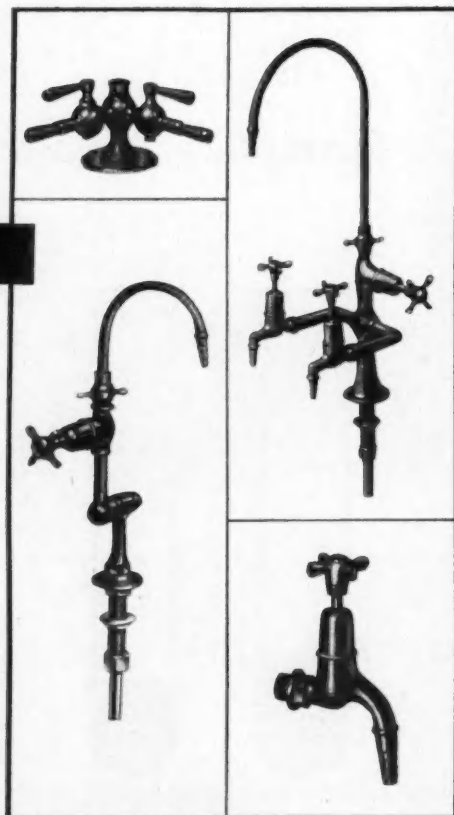
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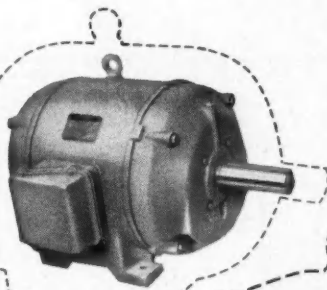
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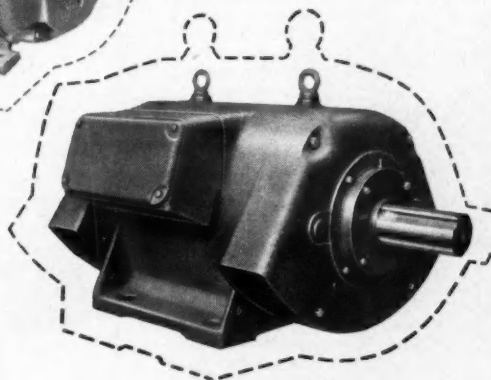


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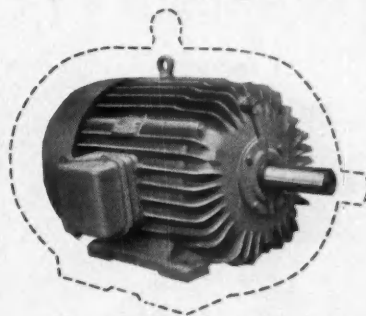
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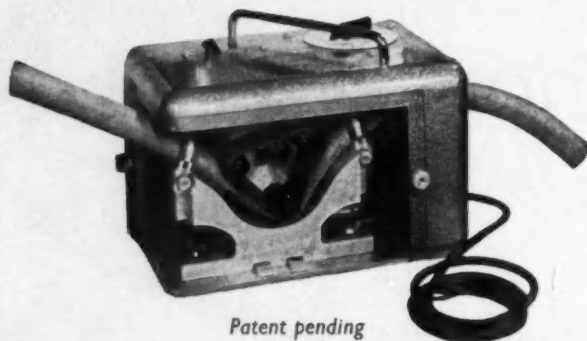


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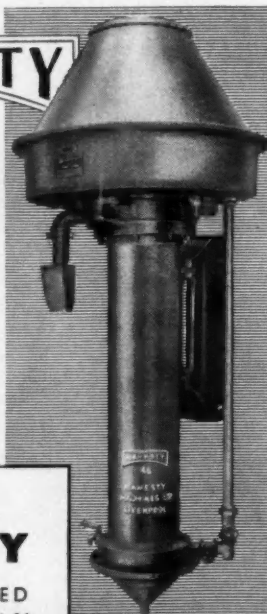
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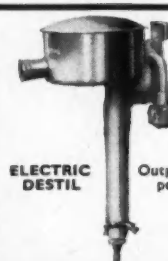
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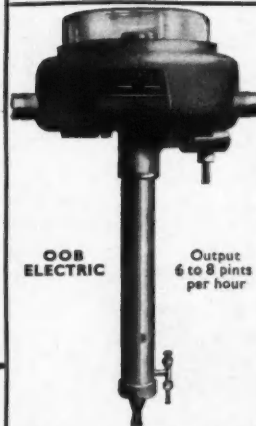
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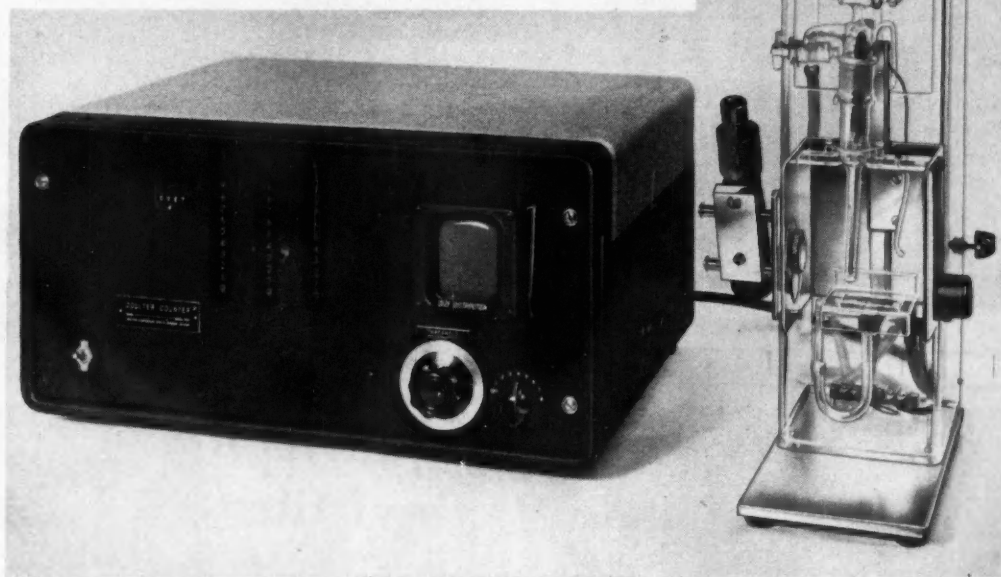
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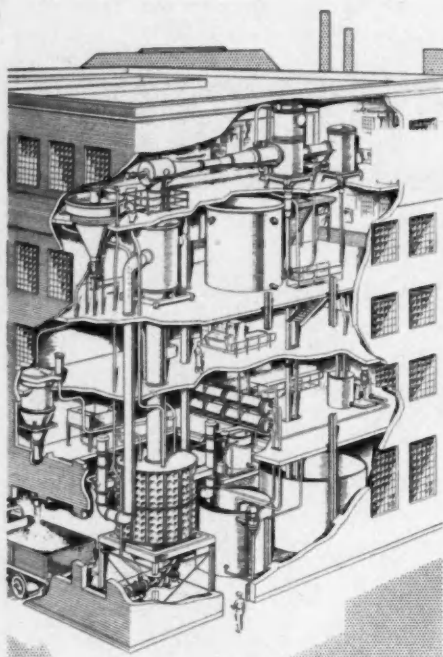
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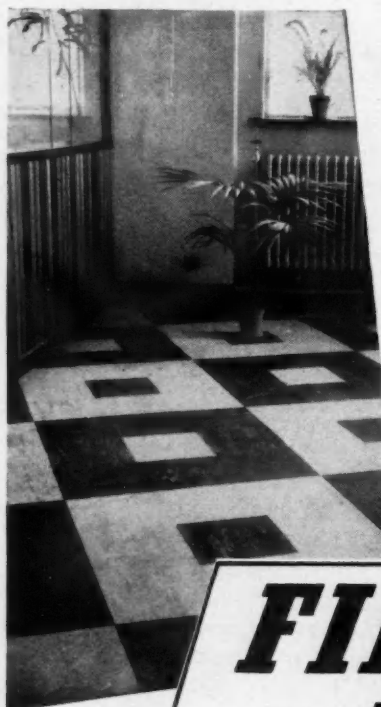
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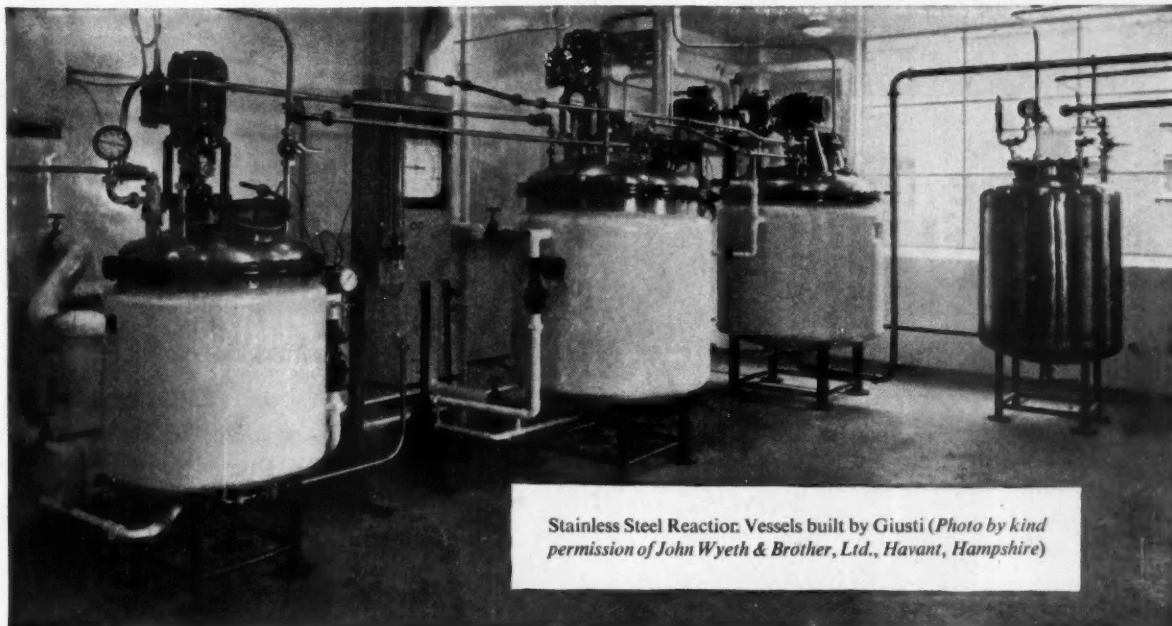
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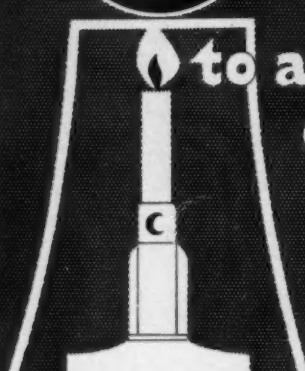


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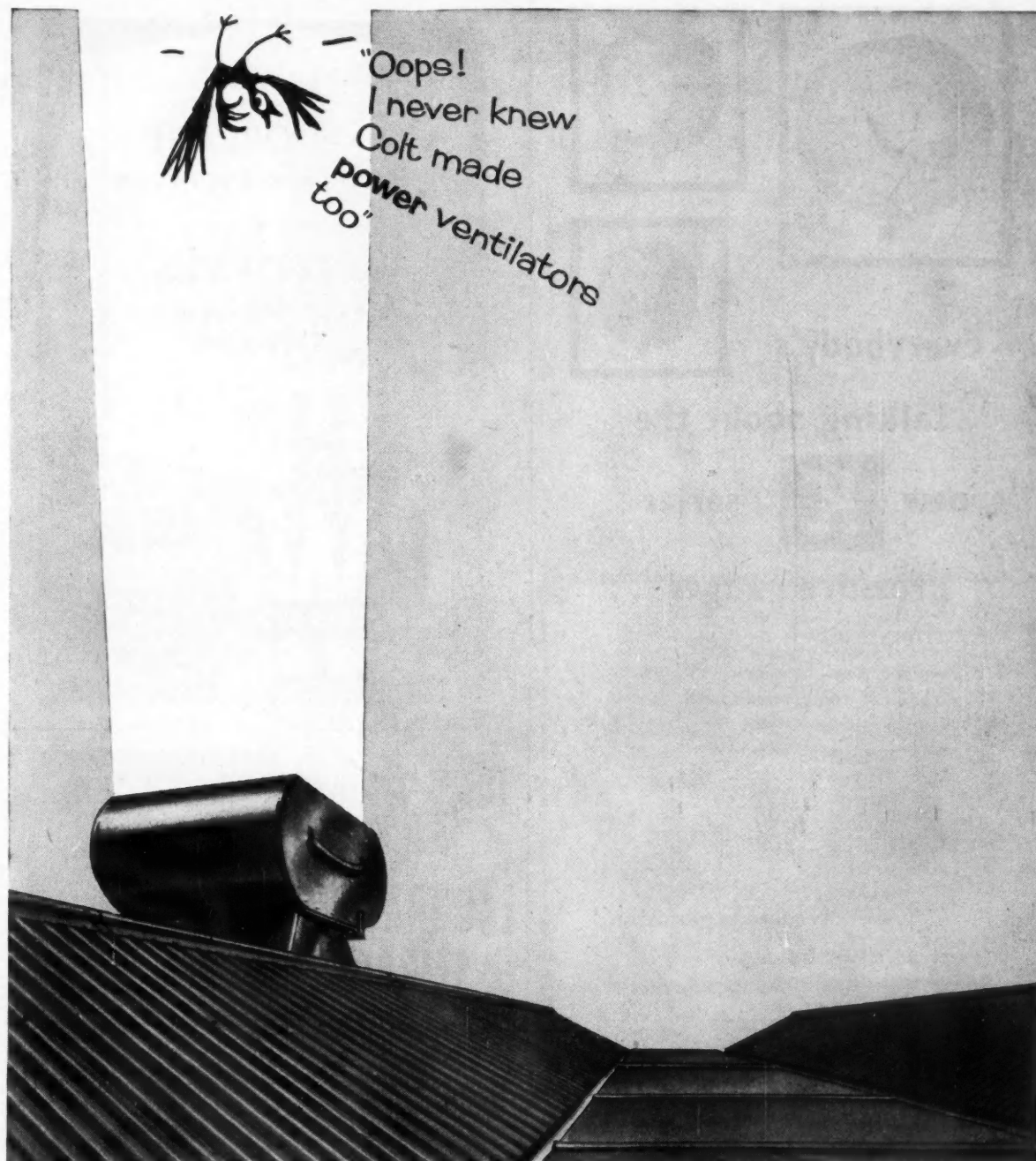
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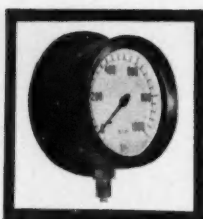
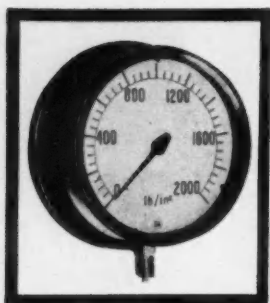
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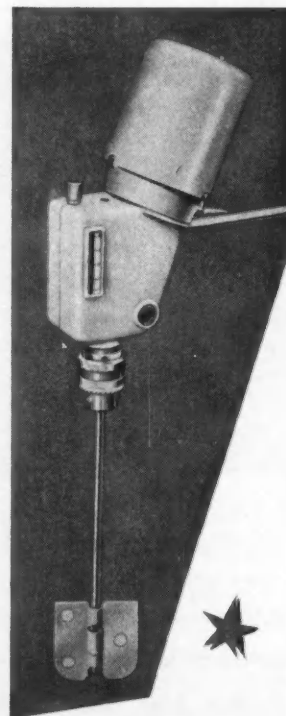
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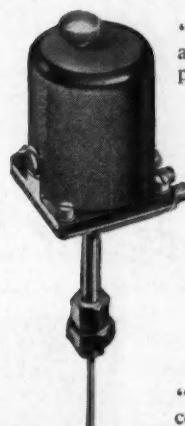
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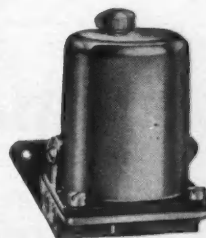


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Compressors for Industrial Gases

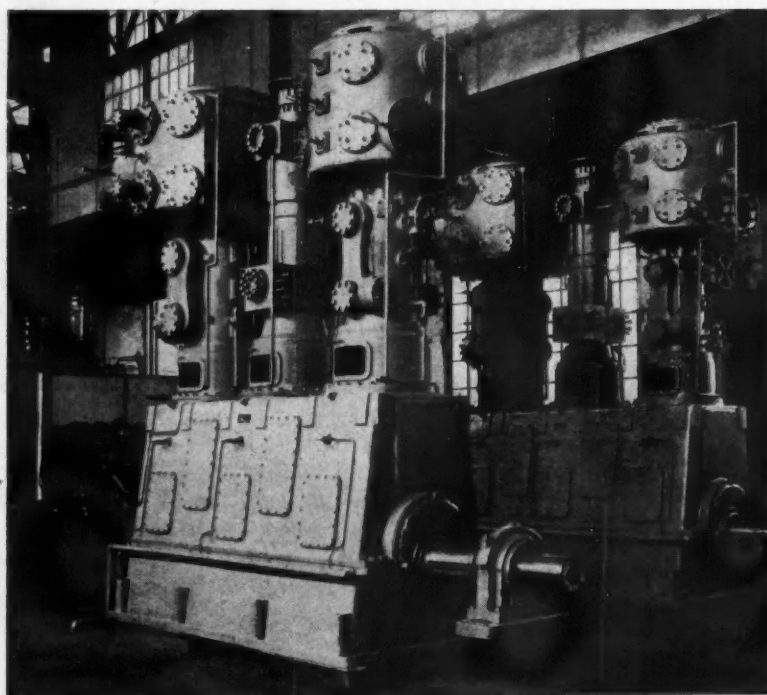
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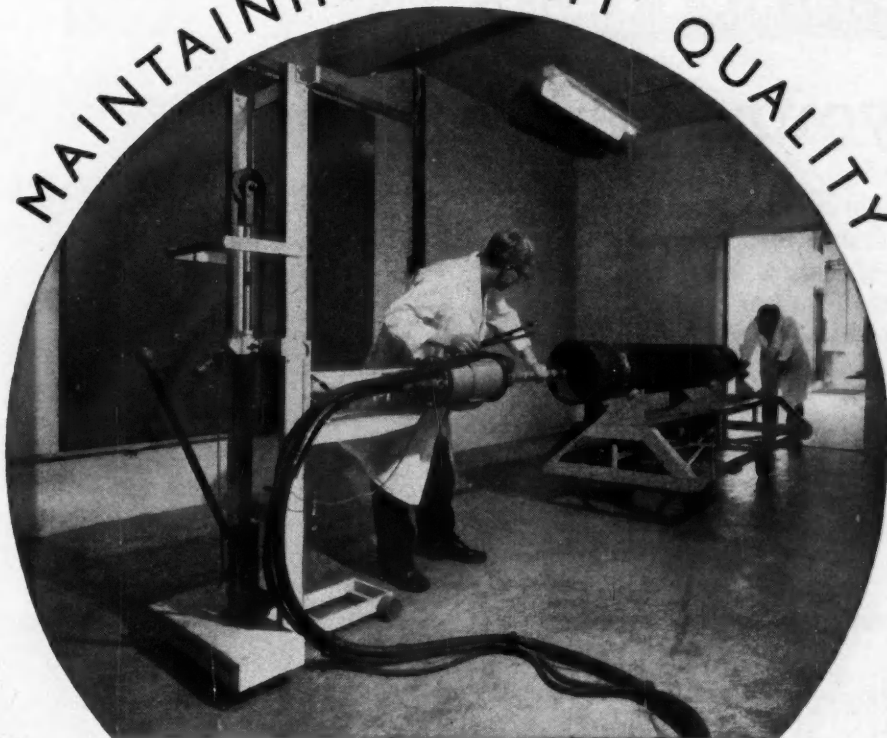
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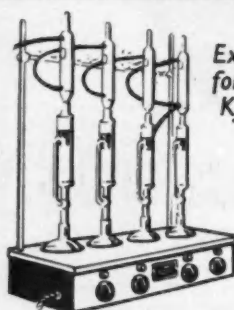
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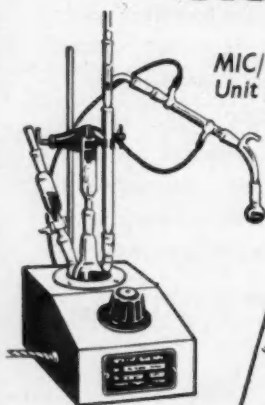
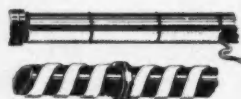
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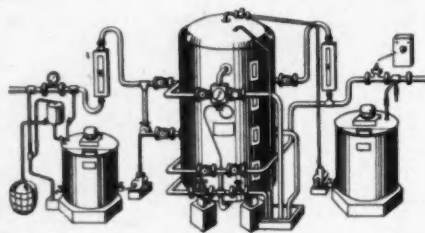
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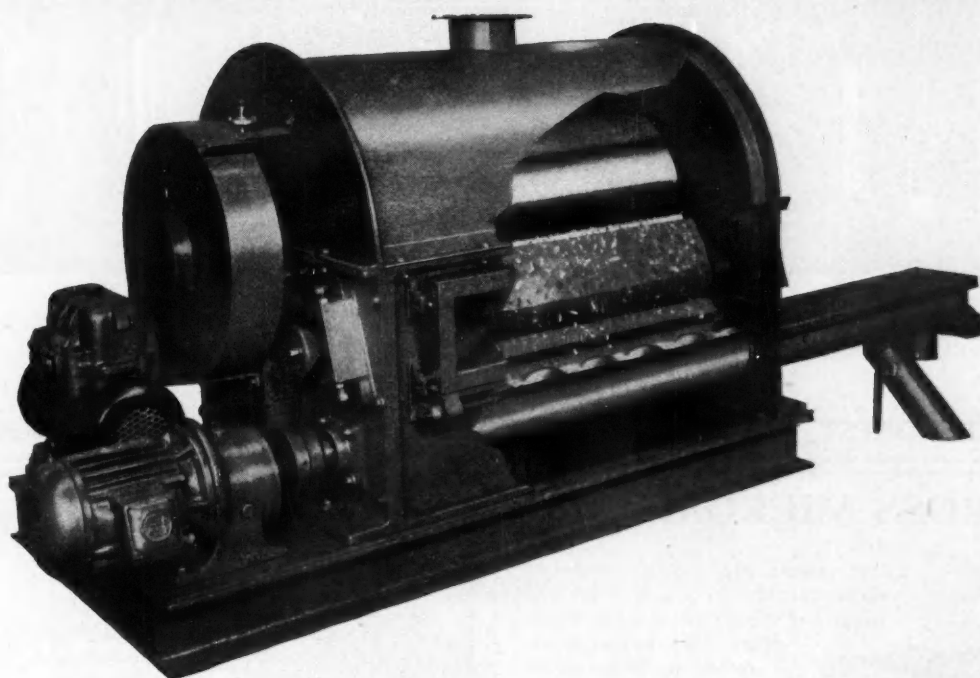
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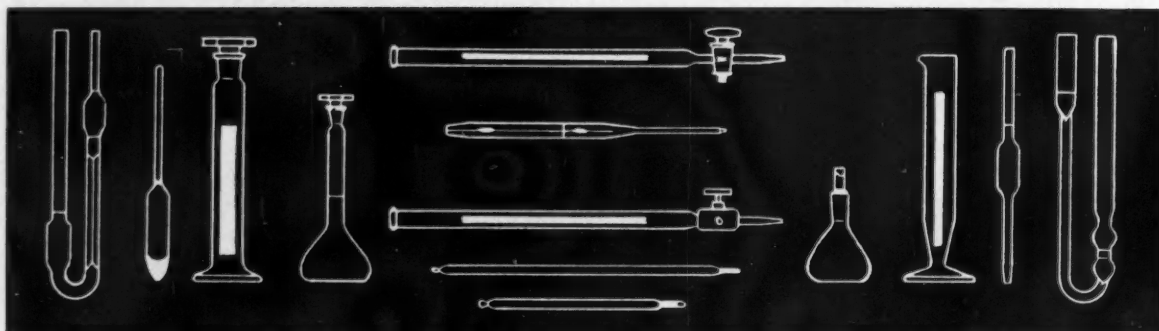
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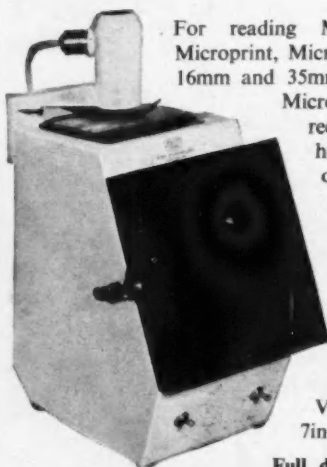


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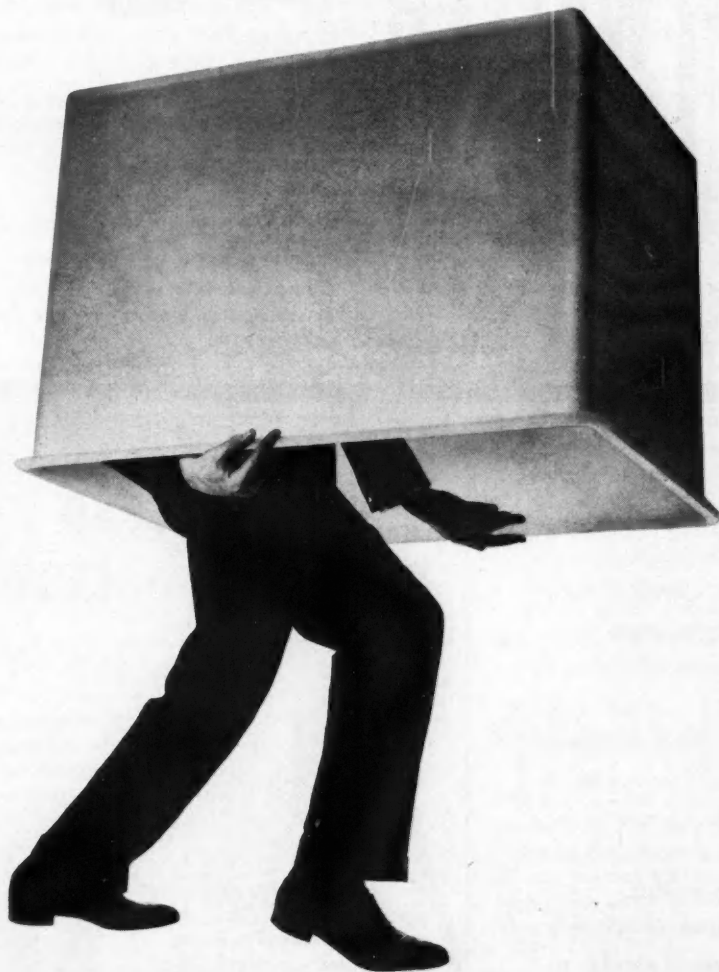
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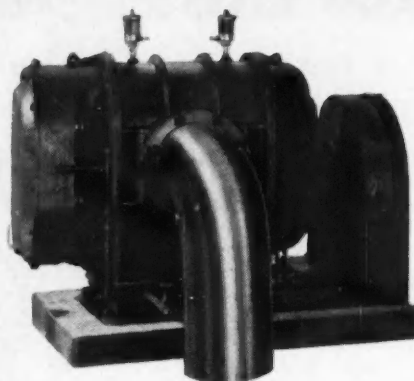
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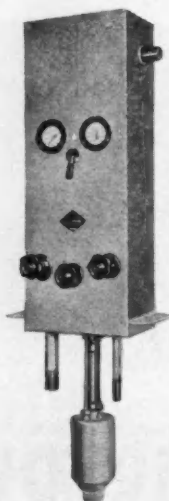
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Because the glass manufacturers believe that this service should be used as widely as possible, all the facilities under headings 1, 2 and 3 are offered as a free service to the packing industry. The only cost to the Packer will be in the supply of goods, containers and such items as labels and transport. In the case of Area Test Marketing Schemes however, a nominal charge will be made for planning the operation.

Security

Where any of these tests are carried out on new products, the whole operation can be executed with absolute security. Packers can have complete anonymity by employing one of the several brand names that have been registered especially for this purpose.

If you would care to have further details of this service, please do not hesitate to ask, whether your interest is immediate or long term. Your Glass Container Manufacturer will be happy to discuss your problem and to help you in any way. Details of the scheme have been published as a booklet, copies of which are available on request from your Glass Manufacturer or from the Federation.



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3 Shelf Testing Service

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JUNE 18 1960

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CHEMICAL AGE

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EAST GERMAN EXPANSION

THE past few years have seen major expansion of East European chemical industries, some of the projects being spectacular in size. This, of course, is explained by the fact that the Soviet bloc was slower to develop its chemical facilities in the years following the war and only in recent years has come to give top priority to the industry.

Whatever spectacular advances have been achieved in the realms of electronics and space research, there is no doubt that East Europe lags behind the West in both the science and technology of chemical processing. There can be no doubt that the gap is now being closed and that a big effort is being put into the rapid development not only of its production of basic chemicals, but also of intermediates and plastics materials and synthetic fibres.

Whether all the items of the much vaunted Soviet shopping list materialise or not, some valuable contracts have been placed in this country, in West Germany and elsewhere. Others are now being negotiated and further business is likely to result both in the sale of know-how by chemical companies and in design and engineering by contracting companies. Plant manufacturers, too, can expect to do business, for Soviet-bloc countries are still plagued by difficulties in the supply and efficiency of many items of equipment.

The East German chemical industry plans to rival the growth of the Federal Republic, doubling 1958 output, valued at 8,800 million marks, by 1965 with production then worth 18,100 million marks (taken as Westmarks, the equivalent of £1,510 million). Chemical investment in the period 1961-1965 is planned at 11,000 million marks, about 150% up on current investment levels.

East Germany's chemical industry now claims to have corrected the 'unbalance' in the field of basic chemicals and will in the coming year place its expansion emphasis on such finished products as plastics and synthetic fibres. The table below, taken from official sources, shows active and planned output for major chemicals in East Germany.

A large plant under construction at Coswig—claimed to be the biggest gypsum-sulphuric acid plant in the world—will on completion produce some 300,000 tonnes/year of sulphuric acid. The first stage, with an initial annual capacity of 100,000 tonnes came on stream on 1 June. The second stage, to raise output by a further 100,000 tonnes, is due on stream by 1 June 1961.

Carbide output will be stepped up by the opening by Veb Chemische Werke Buna, some 90% of whose production programme is based on carbide, of a new three-furnace carbide plant. The first furnace will come into use early next year. Capacity of the triple 40,000 kW furnaces is expected to be well above planned output. A two-furnace high-capacity carbide plant is to be installed at the Veb Stickstoffwerk Piesteritz, as well as a third phosphorus furnace with a capacity greater than that of both existing units. Under construction at Piesteritz are also plants for the production of nitric acid and phosphates. Other projects under construction include a phosphoric acid plant by Veb Chemiewerk Oranienburg and

the expansion of superphosphate production at Salzwedel and Magdeburg, nitrogen production at Leuna and photographic gelatine at Calbe.

E. GERMAN PRODUCTION OF CHEMICALS

Product	(In '000 Tonnes)		1965 '65 as % of '58
	1958	1961	
Sulphuric acid ...	531	712	1,005
Soda ...	552.9	636	730
Caustic soda ...	296.4	332	440
Calcium carbide ...	831	1,013	1,180
High-purity phenol ...	16.7	17.2	50.2
Methanol ...	64	88	153
Acetic acid ...	43	57	63
Caprolactam ...	7.6	9.3	23.9
Ammonia ...	365.3	?	425
Fertilisers:			
Nitrogenous ...	320	342	386
Phosphorus ...	136	193	284
Potassium ...	1,528	1,600	2,128
Paint, etc. ...	?	169	266.3
Synthetic fibres ...	6.7	12.7	38.9

Output of synthetic fibres is scheduled for a five-fold increase before 1965, while that of pharmaceuticals, detergents, textile and leather auxiliaries will double. As part of the extension of nitrogenous fertiliser output, nitrates will be given priority and the share of ammonium sulphate in total output should fall from 55% to 30% by 1965. Expansion of the potassium industry will call for investments equal to £67 million.

Petrochemical output is to be the subject of a major expansion. Last year, when a total of about 3 million tonnes of brown-coal tar and universal oil were processed, mineral oil had a share of only 38% in hydrocarbon base materials; by 1965 this share will be 76%, and such products as benzole, toluole and xylol, at present imported, will be produced in quantities sufficient to cover home demand. Petrochemical centre is to be "Leuna II", where an olefins-from-mineral-oil cracker is now under

construction and where a 100,000 tonnes/year ethylene unit based on benzene cracking is to come on stream in the future. In 1965, a national output on petrochemical basis of 56,000 tonnes of benzole, 25,000 tonnes of phenol, 16,000 tonnes of propylene and 31,000 tonnes of xylol is planned. Present total ethylene output is 33,700 tonnes a year.

Plastics development has been relatively slow in East Germany of late and is now to be stepped up considerably. Among future projects are a large-scale low-pressure polythene plant, to open very soon, plants for the production of polypropylene and isotactic polystyrene, increased production by modern processes of melamine and urea, the start—in 1965—of production of polycarbonates and fluorocarbon plastics, the start this year of silicone rubber production at Veb Chemiewerk Nünchritz, introduction of a new synthetic rubber type—the low-temperature Buna-S4-T—by the Bunawerke concern in 1962 in commercial quantities and other plans. The table below shows the expansion of plastics production in East Germany:

E. GERMAN PRODUCTION OF PLASTICS

Products	('000 Tonnes)			% increase '58-'65
	1958	1960	1961	
All plastics ...	93	—	153	234
P.V.C. ...	54.5	60	80.6	126
Polystyrene ...	3.7	—	11.1	20
Phenoplastics ...	—	16	25*	35
Aminoplastics ...	—	32	40*	50
Polyvinyl acetate ...	—	6	10*	12
Polythene (high- and low-pressure) ...	—	1	30*	50
Unsaturated polyester resins ...	—	—	4*	5
Polyamides ...	—	1.6	4*	6
Synthetic rubber ...	84	—	91	105

* 1963

NYLON PRICE CUTS

A PRICE reducing spree by U.S. nylon moulding resin producers followed the recent cuts made by Foster Grant, who reduced their price of nylon to \$1.04/lb. and to 98 cents/lb. if purchased in 80,000 lb. lots or more. Du Pont and other producers reduced general purpose natural colour resin to 98 cents/lb. for 20,000-lb. lots, a rate which has now been met by Foster Grant. Caprolactam in molten form now sells at 49 cents/lb. and is expected to fall to 45 cents/lb. early in January 1961.

When Allied Chemical made their price reduction it was stated (*Chemical and Engineering News*, 1960, 38, 34), that the cut was intended to make nylon 6 resins competitive with Du Pont's formaldehyde (Delrin) which sells at 88 cents/lb.

U.S. nylon demand is expected to reach 34 million lb. this year; 28 million lb. for moulded and extruded products; 6 million for monofilament. This is about 30% more than 1959 demand. Present capacity is 45 million lb. Du Pont, the only U.S. producers of Delrin, have a capacity of 12 million lb./year.

U.S. caprolactam capacity is estimated at 60 million lb., but substantial increases are planned. Du Pont's new 50 million lb. a year plant is due on stream at Beaumont, Tex., early next year, while the Dow Badische plant is due in operation at Freeport, Tex., late next year with a 40 million lb./year capacity. Allied Chemical's National Aniline Division is increasing capacity at Hopewell, Va., to 130 million lb. a year. All this additional capacity should lead to a lower price for caprolactam and—in due course—to reductions for nylon 6.

Expansions in nylon capacity are also in hand. Foster Grant are raising their capacity; Spencer Chemical Corp. and Allied Chemical also have plans to expand existing facilities. Firestone Rubber are to make some nylon moulding resin when they start their new nylon 6 plant at Hopewell, Va., this summer. New outlets are envisaged to meet this additional capacity and one of the U.S. producers, Foster Grant, hope that the new lower price levels will broaden the use of nylon in domestic wares such as kitchen mixers, electric shavers, radio cabinets and lighting fittings.

I.C.I. AND ARGON PRODUCTION

OUR note and comment of 21 May implied that the production of argon from ammonia synthesis would be uneconomic unless there was a major market for the producer, either captive or otherwise. It was stated that the argon produced by I.C.I. at Billingham was for captive use.

We are interested to learn from the company's Billing-

ham Division that I.C.I.'s production of argon is economic and that it competes successfully with other argon-producing processes in the U.K. Although some of the argon produced at Billingham is used by I.C.I. and their subsidiaries, a considerable quantity is sold as liquid in bulk to other companies. In fact I.C.I. supply argon in this way to a number of major consumers in the U.K.

Project News

Mitchell and Fraser to Handle Sorbitol and Sextone Extensions

SUBSTANTIAL extensions to the production facilities of Howards of Ilford for Sorbitol 70% syrup are announced as part of the company's major projects for 1960, all of which are now well advanced. Contractors are L. A. Mitchell Ltd.

Another of the 1960 projects, the rebuilding on a considerably increased scale of the unit producing cyclic ketones, mainly cyclohexane and methylcyclohexanone (Sextone and Sextone B), has W. J. Fraser and Co. Ltd., Romford, as contractors.

The third project, the rebuilding of the remaining section of the aspirin unit, is like the other two, scheduled for completion before the end of February 1961. Last year rebuilding of the recrystallisation stage of the aspirin plant was one of two main plant expansions undertaken by Howards at Ilford; the other was the construction of a phthalic anhydride plant.

Howards are the major U.K. manufacturers of cyclic ketones and the only producers in this country of Sorbitol. When the extensions to these plants are completed there will be in each case, state the company, considerable excess capacity over the present U.K. sales level; capacity will be sufficient to take care of expected sales growth for some years.

W. J. Fraser have also been awarded a major contract in connection with the large-scale South African plants of British Titan Products (see 'Chemical Age', 5 September, 1959, p. 259).

Courtaulds to Double Grimsby Acrylic Output

● A CONTRACT, valued at more than £20,000, has been awarded to William Boby and Co. Ltd., water treatment engineers, Rickmansworth, Herts, by Courtaulds Ltd. for the extension of their Courtelle acrylic fibre plant at Grimsby. Work has already begun on the plant which will produce 10 million lb. of Courtelle a year, thus doubling the present Grimsby capacity. The new extension is scheduled to go into production early in 1961. Courtaulds, who also produce 2 million lb. of Courtelle a year at their Coventry factory, say that they can sell all the 22 million lb. total and more.

Fraser to Build Chlorine Project for Murgatroyd's

● CONTRACT to increase chlorine production at Elworth, Sandbach, Ches, by 50% for Murgatroyd's Salt and Chemical Co. Ltd., the jointly-owned Fisons and Distillers subsidiary, has been awarded to W. J. Fraser and Co. Ltd., Romford, who are the main contractors

for plant construction and installation. Project managers for the expansion are D.C.L. Engineering Division. The new plant will cost about £1.5 million and is scheduled to come into production in the latter half of 1961. Architects for the project are Bernard Taylor and Associates.

Murgatroyd's have associations in the chlorine usage field, through D.C.L., with British Hydrocarbon Chemicals, whose Grangemouth expansion includes a new ethylene dichloride plant, and with British Geon, who are currently raising p.v.c. capacity at Barry, Glam.

Catalytic Reforming Process Licensed to W. D.

● A LICENCE to exploit a cyclic catalytic reforming process (U.G.I. CCR process) for the manufacture of gas by reforming fluid hydrocarbons has recently been obtained by Woodall-Duckham Construction Co. Ltd. from United Engineers and Constructors, Inc., Philadelphia. Plants built in accordance with the process are said to be particularly suitable for large daily outputs.

British Acrylic Fibre Plant For Yugoslavia

● PLANT and machinery worth more than £2 million is to be supplied for an acrylic fibre factory in Yugoslavia, under an agreement recently concluded between Courtaulds Ltd., together with their wholly owned subsidiary Luna Ltd., and three Yugoslavian concerns: Acetilen of Skopje, Invest-Import of Belgrade and Vardar Export-Import, Skopje. Deliveries of plant will begin next year and the factory will be in operation in 1962.

As reported in CHEMICAL AGE at that time, last year Courtaulds, through Prinex Ltd., a subsidiary, concluded contracts worth about £15 m. covering the supply to Russia of complete plants and technical processes for the manufacture of viscose rayon, tyre cord, acrylic staple

fibre and cellulose acetate yarn. The company also completed a contract in July 1958 worth about £5 m. to supply machinery for a textile factory in Russia.

New Compound Mill

● A NEW compound mill is being built at Bromborough, Ches., by Holland and Hannen and Cubitts (North West) Ltd., at a cost of about £1 million. The mill is for the British Extracting Co. Ltd., Bromborough Port, New Ferry, who are oil seed crushers and manufacturers of animal foodstuffs for Lever's Feeds Ltd. Work is scheduled for completion by September 1961. The mill will comprise a raw materials warehouse, silo building, production building and finished products warehouse, etc.

Gasification Process

● WESTWOOD AND WRIGHTS LTD., Brierley Hill, Staffs, have reached an agreement with Aug-Klönne, Dortmund, for the U.K. manufacturing rights of the Klönne improved system of high pressure gasification, based on German patent 1/012,423 and B.P. 729,625.

Lummus to Build D.C.L.'s New Acetic Acid Plant

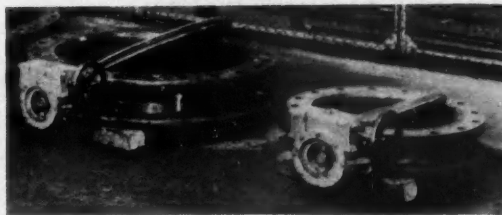
● THE Lummus Co. Ltd. have been appointed by the Distillers Company to carry out the mechanical design, procurement and supervision of construction for the £2 million acetic acid plant at Hull (see CHEMICAL AGE, 11 June, p. 947). The plant, expected to come into operation early in 1962, will be the first of its kind in Europe. It will use a new process developed by the Research and Development Department of Distillers, based on the direct oxidation of a light petroleum fraction.

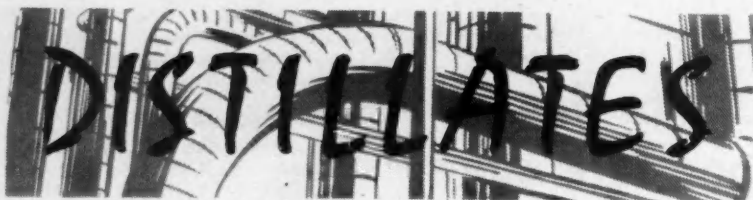
Anti-Dumping Duty on East German Sodium Chlorate

An order laid by the Board of Trade with effect from 9 June, has imposed an anti-dumping duty of £19 per ton on sodium chlorate originating in the Soviet Zone of Germany. Proof of origin will be required of any sodium chlorate exported to the U.K. from East Germany (including East Berlin), the Federal Republic of Germany, the Netherlands, Belgium, France, Denmark, Norway, Sweden and Poland.

Boving Butterfly Valves for B.H.C. Plant at Grangemouth

Butterfly valves made by Boving and Co. Ltd., 41-47 Strand, London W.C.2, are being supplied to British Hydrocarbon Chemicals. Fourteen will be installed at Grangemouth within the next few months.





★ "You build such hideous plants", wrote a lady shareholder to the secretary of Simon-Carves, adding "don't send me any more annual reports because I hate the pictures". The secretary might have replied pointing out that the company rendered many essential services to many essential industries, begging her to accept her dividends in the certain knowledge that if Simon-Carves did not build hideous plants, then someone else would and perhaps would not build them so well.

As I pointed out recently, U.S. companies' investment in chemical plant 'beautification' presents the industry with a multi-million dollar bill each year. Perhaps this is because they have a high proportion of lady shareholders who can't stand "hideous plants". In any event, the shareholders of the Simon Engineering Group, whatever their sex, could not have made a sounder investment than the chemical plant and allied industries.

★ A NEW chemical which it is thought can help remove one of the greatest difficulties met in mining and construction generally—seepage—was born of an idea that didn't work and of a chemical that had no apparent use. The idea came from the U.S. Army Corps of Engineers which sought a chemical spray to turn sand or earth into a tough, hardened airstrip within a matter of hours.

Among the compounds tested was calcium acrylate, supplied by American Cyanamid, which proved effective in field trials but was too difficult and costly to apply. Although the airstrip idea was dropped, development continued for seven years under Cyanamid's Dr. Abbot M. Swift, supervisor of special projects. He discovered that calcium acrylate, combined with a chemical to turn aqueous solutions into stiff gels, would produce a chemical grout that appeared to be the answer to water seepage problems.

Further tests showed that while cement had in the past met grouting needs, there were many situations where it was too wasteful or unusable because of technical difficulties. Cyanamid's new grout, AM-9, proved an economic and efficient alternative (see p. 1011).

★ A VINTAGE CAR powered by the sun sounds like an anachronism in science fiction. But a 1912 Baker electric brougham recently demonstrated in the U.S. has a panel of 10,640 solar cells, fixed to the roof that generate electricity from sunlight. The demonstration was

made to show advances made in turning sunlight into electricity.

The International Rectifier Corporation, who assembled the panel, claim that solar-powered cars might have many applications in sunny climates. About 100 watts at 115 volts have been generated by the panel, which cost \$15,000. If made in quantity the price could be cut to about \$2,500.

The cells are made of wafers of silicon crystal treated with an unspecified boron compound. The silicon is extremely pure and the boron treatment carefully controlled.

★ A UNIQUE T.V. advertising programme is being used to promote the use of American Dithane, produced by Rohm and Haas in the U.S. and distributed in the U.K. by Pan Britannica Industries and Shell Chemical. For a period of three months, weekly 60-second commercials, incorporating a potato blight report, will be screened in the Midlands, Wales and West of England and East Anglia. This report is closed within hours of the commercial being screened and the film-making is a last minute rush to catch the T.V. contractors' deadline.

Introduced in the U.K. two years' ago for trial purposes, American Dithane is now being marketed on a large-scale. The T.V. series is also backed by large-scale poster advertising.

Dr. Hesayan of Charles Lennig and Co., who make much of the Rohm and Haas product range in the U.K., told me when I saw the first of the T.V. films last week that there are no plans at present for making American Dithane in the U.K. The process is complicated and, apparently, the highly specialised equipment is not at present available in the U.K.

★ Of the three European operating companies of Acheson Industries (Europe), the oldest is celebrating the 50th anniversary of its foundation by Dr. Edward Goodrich Acheson when he came to Britain from the U.S. before World War I. During a progressive career in colloid manufacture, Acheson Colloids Ltd., have served every industry, the armed services and research associations. To mark the jubilee year, Mr. Howard A. Acheson, son of the founder and president of the Acheson organisation, has presented the City of Plymouth, where the factory has been sited since 1910, with a magnificent 'standing salt'.

With the other two European companies—Acheson Dispersed Pigments Co., Dukinfield, and Acheson Colloids N.V.,

Scheemda, Holland—Acheson Colloids have engaged in the specialised technique of sub-dividing solids, such as graphite, molybdenum disulphide, boron and pigments, and in preparing dispersions from these materials.

In page 1018, Mr. Edward A. Smith, executive manager of Acheson Industries (Europe) Ltd., describes the unique features of the recently opened Edward Goodrich Acheson Hall of Chemistry at Buffalo University, New York State, financed by the Acheson family and the Carborundum Company. He tells me that the overall interior effect is one of efficiency and exuberance. It made him feel that it would be pleasant to re-work his own undergraduate days in such surroundings.

★ THE special form of expanded polystyrene known as Marleycel, based on a product of the Shell Chemical Company, is being incorporated in one of the largest building projects in the East End of London, the Clive Street development in Stepney where Wates Ltd. are building multi-storey blocks of maisonettes for the London County Council.

This is the first time the flexibilised expanded plastics has been used in so large-scale an operation, and its dual purposes are under-floor thermal insulation, for under-floor electrical heating, and as impact sound insulation.

I am told that the L.C.C. use this type of insulation for electrically (floor) heated dwellings since with the polystyrene they get a greater insulation value at $\frac{1}{4}$ in. thickness than with any other material of comparable price and suitability.

★ THE movies and the talkies appear to be things of the past for—heaven preserve us—now the 'smellies' are with us. And the U.S. chemists have a new job. Details that reach me refer to the fact that 20 to 30 different smells are needed per film if it is to be anything like a real 'smelly' and that for each single smell as many as 30 different chemical substances are needed to form the very special aromatic compound which conveys to the audience the smell of new bread or a street in Shanghai.

Many of the aromatics required had either never been produced at all or only produced in very small quantities.

Interesting is the question of smell propulsion within the cinema. Two processes have as yet been developed by U.S. chemists. The first uses compressed air for carrying the smell through a pipe system with openings on every seat. The smell thus projected fades quite quickly and there is no need for the cinema air to be purified before the next smell comes along. The second process is based on the use of aerosols, whose odourless and inactive 'fuel' gas carries the smell through the ventilation into the auditorium.

Alembic



B. F. J. Schonland
(Knight)

Birthday Honours for Government Scientists



A. A. Smales
(O.B.E.)

SCIENTISTS in Government service figured rather more prominently in the Queen's Birthday Honours List, than did those in industry or academic establishments. Mr. B. F. J. Schonland, director of the A.E.A. Research Group received a knighthood, while other A.E.A. staff to be honoured included Mr. A. A. Smales (O.B.E.). Mr. J. S. Carter, Chief Alkali Inspector, received the C.B.E. In industry, Mr. E. H. Harman of the Yorkshire Tar Corporation was awarded an O.B.E., and Mr. C. H. Allen, a chemist with Tate and Lyle, an M.B.E.

VISCOUNT

Field-Marshal Sir William Slim, former Governor-General of Australia, and a member of the board of Imperial Chemical Industries Ltd.

BARONETS

Sir Herbert Walter Butcher, M.P., a director of the Beecham Group and other companies.

KNIGHTS BACHELOR

Frank Bower, president, Association of British Chambers of Commerce; **William Hunter McFadzean**, president, Federation of British Industries, and chairman British Insulated Callender's Cables Ltd.; **Basil F. J. Schonland**, director, Research Group, U.K. Atomic Energy Authority; **Gordon B. B. McL. Sutherland**, director, D.S.I.R., National Physical Laboratory.

ORDER OF THE BATH C.B.

F. M. Lea, director, D.S.I.R. Building Research Station.

IMPERIAL SERVICE ORDER

T. Lacey, principal, Department of Scientific and Industrial Research; **E. W. Pratt**, senior principal scientific officer, Admiralty.

ORDER OF THE BRITISH EMPIRE K.B.E.

Robert Cockburn, chief scientist, Ministry of Aviation.

C.B.E.

T. E. Allibone, director, research laboratory, Associated Electrical Industries Ltd.; **J. S. Carter**, Chief Alkali Inspector, Ministry of Housing and Local Government; **E. T. C. Grint**, chief labour officer, Imperial Chemical Industries Ltd.; **Professor A. W. Scott**, for

contributions to food dehydration industry and services to the research establishment, Aberdeen, Ministry of Agriculture; **J. C. C. Stewart**, deputy managing director, Production Group, U.K. A.E.A.; **P. H. L. Thomas**, director of Ordnance Factories (Filling), War Office.

O.B.E.

N. Davey, senior principal scientific officer, D.S.I.R. Building Research Station; **Miss M. D. Glynne**, principal scientific officer, Rothamsted Experimental Station; **S. Gunson**, superintendent, mechanical engineering, Atomic Weapons Research Establishment, Aldermaston; **E. H. Harman**, deputy chairman, East Midlands Gas Board and director of the Yorkshire Tar Corporation; **G. M. Harvey**, managing director, British Oxygen Wimpey Ltd.; **G. E. Howling**, lately principal, Mineral Resources Division, Overseas Geological Survey; **J. C. MacCallum**, director of research, Laclede Research Association; **D. C. McKenzie**, principal scientific officer, Armament Research and Development Establishment, War Office; **L. Patrick**, Head of I.C.I. Government contracts department; **F. H. Saniter**, director

of research, United Steel Companies Ltd.; **A. A. Smales**, deputy chief scientist, Atomic Energy Research Establishment, Harwell; **N. K. Smith**, technical director, Murphy Chemical Co. Ltd.; **F. B. Thole**, lately senior principal scientific officer, Ministry of Power.

M.B.E.

C. H. Allen, chief chemist, Tate and Lyle Ltd., Plaistow Refinery; **C. A. Brighton**, C.D. officer, Distillers Company, Barry; **L. Godber**, local director and general manager, Newton Chambers and Co. Ltd.; **Alderman T. V. Keelan**, assistant education officer, I.C.I. Plastics Division; **R. E. Lewis**, works general manager, packaging and distribution division, Evans Medical Ltd.

B.E.M.

C. G. Andrews, senior assistant (scientific) D.S.I.R. National Chemical



C. H. Allen
(M.B.E.)



Miss E. M. R. Fisher
(B.E.M.)

Laboratory; **J. E. Aucott**, Armament Research and Development Establishment, War Office; **Miss E. M. R. Fisher**, senior scientific assistant, Atomic Energy Research Establishment, Harwell.

Mr. Khrushchev at I.C.I. Plastics Division Exhibition in Moscow



At the I.C.I. Plastics Division exhibition, at the Polytechnical Museum, Moscow, on 2 June were, l. to r. front, Sir Patrick Reilly, British Ambassador, Mr. Khrushchev, Mr. J. C. Swallow, division chairman, Dr. J. S. Gourlay, I.C.I. overseas director, and J. W. B. Peel, I.C.I. East European department. Mr. Khrushchev, who was accompanied by half the Praesidium Central Committee, welcomed this kind of informative exhibition and wished it every success.

HIGH HOPES FOR ECONOMIC WORKING OF BRITAIN'S BIG GASIFICATION PLANTS

ONE feature common to the British gas industry's big new projects for the gasification of either coal or oil is that tonnage supplies of oxygen are called for. The production of oxygen on the large scale for gas manufacture is something that is new to gas works in this country. It is noteworthy that, in the second stage of the South Eastern Gas Board's oil gasification project at the Isle of Grain, using the Shell gasification process, the supply of oxygen forms about 40% of the total cost of gasification. Out of the actual capital expenditure of £4,626,000 for Stage 2, including all the various gas production and processing plants, water treatment and power services, etc., the oxygen plant accounts for £1,099,000.

The tonnage oxygen plant which will provide the compressed gaseous oxygen required for the Shell gasifiers is being constructed by Air Products (Great Britain) Ltd. It is designed to produce 186 tons/day of gaseous oxygen at a pressure of 450 p.s.i., and simultaneously up to 4 tons/day of liquid oxygen, all at a purity of 95%. Further details of the oxygen plant, along with a comprehensive review of the Isle of Grain projects, are given in a paper presented to the 97th annual general meeting of the Institution of Gas Engineers (Edinburgh, 31 May to 3 June) by C. Stott, M.C., B.Sc., M.Inst.Gas E., M.I.Chem.E., A.R.I.C., the Board's chief engineer.

Westfield Project. In another paper presented on the same occasion, Mr. T. S. Ricketts, M.Inst.Gas E., chief engineer of the Scottish Gas Board, gives details of the oxygen plants at the Westfield high-pressure coal gasification plant. They are Tonnox plants, designed and constructed by British Oxygen Linde Ltd., and are the first of their kind to be installed by this firm in Britain. They operate on the liquid oxygen pump principle, each plant being designed to produce 100 tons/day of oxygen of 95% purity at a pressure of 426 p.s.i.g., of which 10 tons/day can be available in the liquid state if required. Each unit will simultaneously produce 7 million cu. ft./day of nitrogen having an oxygen content of not more than 1%, some of which will be used after compression for diluting the final town gas.

Because of the secrecy surrounding the cost of the basic raw material for the Lurgi process at Westfield, Mr. Ricketts' references to the economics of the process are made only in general terms. However, he emphasises that the Scottish Gas Board is satisfied that the cost of production at Westfield, including capital charges, will compare favourably with the costs of production at the Board's more modern works, excluding capital charges.

The construction of the Westfield works is now sufficiently advanced to obtain a realistic picture of the true capital cost. It now appears that this will be close to the original estimate of £6.6 million; this is equivalent to a capital charge of 2.9d/therm when amortised over a 20-year period. The capital cost includes many items designed to incorporate, at a later date, stage 3, which will add a further 15 million cu. ft./day to the capacity of the works. Because of this, it is expected that the capital and

operating cost of stage 3 could be appreciably lower than for stage 2.

The gas produced during the process has a hydrogen content of some 75% (assuming the CO₂ content is reduced to 2%) and enrichment will be carried out initially by straight mixing with butane; hydrogen under a pressure of 15 to 20 atm., however, has great possibilities as a hydrogenating agent, and it may well be that the cheapest gas in the future will be obtained by this method, which produces by-products with a high saleable value per therm.

Mr. Ricketts notes that the Gas Council hydrogenation process has not yet been proved and that, undoubtedly, a pilot-plant trial period would be necessary before a full-scale plant was constructed. When the process is finally proved to be a technical success, it might well be that its economic success would be governed by the ability to produce by-products such as benzene.

Increased Shock Resistance for Pfaudler Glassed Steel

GREATLY increased thermal shock-resistance of their new Pfaudler glassed steel 59 is an important development of Enamelled Metal Products Corporation (1933) Ltd., Leven, Fife. This shows an improvement of 30% over conventional glassed steel under the most severe shock treatments caused by the meeting of unexpected or unavoidable temperature differentials. At a temperature of 450°F, it can withstand the thermal shock of ice water at 32°F without any sign of chipping or weakening; and under certain conditions an acid can be raised to 40°F without damage.

The safe delta T for glassed steel 59 at a normal vessel operating temperature is 260°F (formerly 200°F). At the peak operating temperature of 450°F, the safe delta T is now 150°F (115°F). The alkali constancy of Pfaudler glassed steel 59 goes up to pH 11 at 212°F. This higher value reduces the permissible temperature limit up to 80°F pH 14.

These figures contain a general safety factor based on carefully controlled laboratory experiments with temperature variations occurring on the glass side only. When a problem covers thermal shock from the jacket side of the tank, the figures can be considerably higher, because the steel thickness absorbs some of the shock effects.

The unique microstructure of glassed steel 59, which is responsible for the improved thermal shock-resistance, also allows lapping of nozzle faces on all nozzles up to and including 8 in. in diameter.

There is no additional cost for glassed steel 59 on all Pfaudler standard equipment, which includes storage, processing and reaction vessels for high and low pressures, condensers, receivers, evaporating pans, transport tanks, pipes and valves.

Glassed steel 59 is also said to offer 20% more abrasion resistance and will



Pfaudler glassed steel 59 at a temperature of 450°F, withstanding the thermal shock of ice water at 32°F, without any sign of chipping or weakening

give a much longer serving life. The surface facilitates cleaning, ensuring constant purity of product and low maintenance costs. No particles adhere to it and there is no undesirable build-up of polymerised products.

Fire Protection Rental Scheme

A new automatic fire detection service complete with all relative equipment is being offered to industry on a rental basis by Sound Diffusion (Auto-thermic) Ltd., Portslade, Sussex; and the firm claim that no capital outlay is necessary and that installation is free of cost.

THREE NEW SILICONE RUBBERS INTRODUCED BY I.C.I.

THE first three of their range of 'Silcoset' silicone rubbers has been introduced by the I.C.I. Nobel Division. These rubbers are complementary to I.C.I.'s present range of silicone rubbers, differing only by reason of their room-temperature curing properties. Because of this they can be used in circumstances where ordinary silicones cannot be employed.

The principal difference between the three rubbers is their consistency which varies from the pink liquid of 'Silcoset' 100, through the more viscous but still pourable red paste of 'Silcoset' 101, to the stiff red paste of 'Silcoset' 102. Two curing agents are supplied; curing agent A is the general purpose product and curing agent B is for slow curing and extended pot life.

I.C.I. say that 'Silcoset' rubbers can be used in a wide variety of applications. They are suitable for sealing, patching, caulking and potting applications where extremes of temperature are to be encountered, since they are stable over the temperature range -60° to 250°C . They are also suggested for moulding silicone rubber parts where heat curing is undesirable, or when the cost of conventional rubber moulding equipment is not justified, and they have the ability to reproduce the most intricate details in moulding processes.

When dispersed in solvents such as toluene or xylene, 'Silcoset' rubbers can be effectively used to coat an extensive range of organic and inorganic fabrics for use in electrical insulation and anti-stick applications.

New Cyanamid Chemical Prevents Water Seepage in Building and Mining

A CHEMICAL based on calcium acrylate that 'gels' water and prevents dangerous seepage in building, mining and tunnelling is reported to have successfully sealed porous sandstone through which shafts were being sunk in a Scottish coalmine. Quantities of this chemical, developed by the American Cyanamid and known as AM-9 chemical grout, were injected into the sandstone at depths below 2,000 ft. during shaft-sinking at the Monkton Hall colliery, Midlothian.

Cementation Company engineers working on the project—one of the deepest shaft-sinking operations in British coal-mining—discovered that conventional grouts, such as cement in combination with silicates, were unsatisfactory in some of the sandstone bands encountered. Seepage continued through the rock and there were difficulties in completing the shaft lining. They turned, finally, to AM-9 grout which had been successfully used in the U.S. and found that this new chemical grout sealed off the porous sandstone and enabled the shaft-sinking to continue with perfect safety.

AM-9 is marketed in the U.K. and certain other countries by Cyanamid of Great Britain Ltd., who describe the product as heralding "an entirely new concept of soil stabilisation and grouting."

AM-9 is a dry, white powder which, mixed with water, can be applied in an ordinary solution which will penetrate any mass. Dissolved in water with a suitable catalyst, it is injected under pressure into the soil or rock formation. The type of catalyst used controls the gelling time which can vary from a few seconds to several hours. The viscosity of the solution remains substantially the same as that of water until just before the gelling starts.

Cyanamid state that the gel not only prevents the passage of water through the porous mass but also binds together soil, sand or loose rock. Stabilised soils below the water table are believed to retain their properties permanently. AM-9 is said to be particularly effective for solidifying weak, granular soil masses during tunnelling operations, the sinking of caissons and in many types of shaft sinking and excavations. It is not recommended, however, in cases where it is desired to increase the load-bearing characteristics of soils or rocks.

A booklet describing AM-9 and detailing nine specific applications is available from the mining chemicals department, Cyanamid of Great Britain, Bush House, Aldwych, London W.C.2.

New G. E. Man-made Diamond

A MAN-MADE diamond for metal bonded grinding wheels is now available from International General Electric Co. of New York Ltd., the U.K. subsidiary of U.S. General Electric. The new product is an addition to the range of man-made diamonds now being developed by G.E. to meet industrial needs, and is a different type of diamond crystal from those made by I.G.E. over two years ago for use

in vitrified and resinoid bonded wheels.

Typical particles of General Electric's new diamond are of single crystal and 'blocky' shape, with many showing regular crystal faces. Colour ranges from light green to grey-black with light-coloured particles predominating. Crystal surfaces are smoother than the resinoid-vitrified bonded type, but are still considerably more irregular than those of

natural diamond fragments of similar size.

Available in sizes up to 325 mesh, the latest man-made diamond is designed for use in metal bonded grinding wheels for lens laps, glass grinding (including pencil edging and bevelling), electrolytic grinding and conventional grinding on cemented carbide. It is also suitable for forming and shaping synthetic sapphires, cutting germanium and quartz, and grinding ceramics.

New Borates from Borax Consolidated

BORATES range of Borax Consolidated Ltd., Borax House, Carlisle Place, London S.W.1, has been increased. The anhydrous calcium metaborate, $\text{CaO} \cdot \text{B}_2\text{O}_3$, insoluble in water and with a melting point of $1,150^{\circ}\text{C}$, is expected to find considerable use where the presence of alkali metals is disadvantageous.

Boron phosphate, BPO_3 or $\text{B}_2\text{O}_3 \cdot \text{P}_2\text{O}_5$, is also insoluble in water but with a higher melting point of $1,450^{\circ}\text{C}$. In high-grade translucent china, boron phosphate in combination with pegmatite helps to reduce firing temperatures and improve quality. A water-soluble version is available as borophosphoric acid. A range of organic borates has also been developed. These are esters formed by the combination of alcohols or phenols with boric acid, and being liquids can be conveniently incorporated in paints, plastics and other similar materials.

All these products are available in development quantities. Several non-oxygen containing materials can also be supplied for special purposes. These include elemental boron and a series of metallic borides, compounds which are characterised by extreme hardness and resistance to a very high temperature under non-oxidising conditions.

New Amine Catalysts from Robinson Bros.

Two new materials, N-methyl morpholine and N-ethyl morpholine, are being produced by Robinson Brothers Ltd., Ryders Green, West Bromwich, their chief use being as catalyst in the production of polyurethane foam. N-ethyl morpholine behaves chemically as an aliphatic tertiary amine. It is unstable to oxidising agents, being oxidised by bromine and alkaline potassium permanganate solution with rupture of the ring. Apart from its use as a catalyst in polyurethane foam, N-ethyl morpholine has other uses; thus, it forms a salt with penicillin, which is suitable for the separation of Penicillin G. Another example is the use of acidic solutions of N-ethyl morpholine phosphate (ph 3-6) to give protective coatings on steel, aluminium and zinc. The other new chemical, N-methyl morpholine, behaves chemically as an aliphatic tertiary amine. It is unstable to oxidising agents, being attacked by alkaline potassium permanganate in the cold, with rupture of the ring. It will react with alkyl halides to give quaternary salts.

MORE GELATINE FOR EXPORT FROM GLAMORGAN FACTORY

DEVELOPMENTS in the manufacture of gelatine at the Treforest (Glamorgan) factory of P. Leiner and Sons (Wales) Ltd. will have two important effects: (1) the factory will become independent of vast quantities of imported raw material (sun-dried bone) and (2) it will make possible increased shipments of gelatine overseas so that this product will emerge "as a substantial contributor to the nation's export trade, particularly in the dollar markets".

Leiner's factory is claimed to have the world's largest output of ossein gelatine, and to be the largest single producer of gelatine of any kind on this side of the Atlantic. The company's exports have increased from 10% of its production at the beginning of last year to 25% by the beginning of this. Current rate of production is 4,000 tons/year of gelatine. This includes photographic and pharmaceutical grades which make up roughly 10% and 15% respectively, of current output, the remainder being used for various purposes such as food manufacture, confectionery, paper manufacture, printing materials, etc.

The factory, built in 1938, first produced gelatines from hides but has since concentrated more and more on ossein gelatines. Some hides are still used, however, while pig skins are used for certain grades.

The new developments mentioned above have come about through the introduction of a new technique of degreasing bone which makes it possible to use British butcher's bones as a raw material for ossein gelatine. Hitherto the 22,000 tons/year of bone used in the factory have come largely from India and Pakistan, where Leiner have their own crushing mills. But domestic demand for bone for agricultural purposes in these countries has diminished the supply in

recent years and the need was felt for an artificial process which would simulate the Indian climate and degrease bones in such a way that the all-important collagen in the bone is left unharmed. The first loads of British bones arrived at the plant early this year and have since been processed in the new plant, the chief essential feature of which is a 'thermo-screw' arrangement, the crushed bone being passed through a hollow, jacketed screw conveyor in which heat transfer takes place.

After crushing and grading the bone is transferred to wooden vats or brick, rubber-lined tanks where it is immersed in dilute hydrochloric acid and acidulation takes place. During this process, the basic tri-calcium phosphate in the bone is converted into the soluble mono-calcium salt which is run off in solution, later to be converted into di-calcium phosphate. The ossein remaining in the tanks is washed with water to remove all traces of acid and then removed to liming pits where it is mixed with milk of lime and left for up to 90 days, the production of the highest grades of gelatine being dependent on the promotion of the primary hydrolysis of the protein collagen over a protracted period of this order.

The next stage is a further thorough washing of the ossein, with stringent control of the pH to minimise inorganic constituents in the gelatine. The gelatine is now extracted from the ossein under thermostatic control in stainless steel boiling tanks, the resulting gelatine solution being filtered. A sample is then taken and tested for clarity before the gelatine solution is transferred to evaporators for concentration. Cooling of the concentrate on a stainless steel cooling drum follows; drying and grinding, according to the final product required, comprise

the final stages of manufacture.

Associated with P. Leiner and Sons (Wales) Ltd.—who changed their name from the Treforest Chemical Co. Ltd. in 1959—are three companies that together produce hydrochloric acid and lime used in gelatine manufacture, as well as the Indian and Pakistani companies of the Leiner Group and the Leiner gelatine factory in Canada. One of the associated companies is the Glamorgan Alkali and Acid Co. Ltd., who operate a battery of De Nora mercury cells for the production of hydrochloric acid, from which caustic potash, potassium carbonate and caustic soda are derived as by-products.

The manufacturing facilities at the Treforest factory are supported by laboratories for research, quality control and testing, a recent innovation being the establishment of a technical service department.

Soviet Team Visits Fisons for Fertiliser Talks

A TEAM of Soviet scientists arrived in the U.K. on 8 June for 10 days of top-level discussions on agricultural fertilisers. They are the guests of Fisons Fertilizers Ltd. and their programme will include technical discussions at the company's head office at Felixstowe and at Levington Research Station. The visitors will also tour the Thames-site nitrogen works opened last year and the Immingham superphosphate plant, said to be Britain's largest.

This delegation is the result of an official visit by Fisons to Russia last year and a further Fison delegation will visit Moscow next month. Mr. A. Gillies, Fisons production director, has stated that both sides "are interested in the exchange of technical information".

New President for Cosmetic Chemists

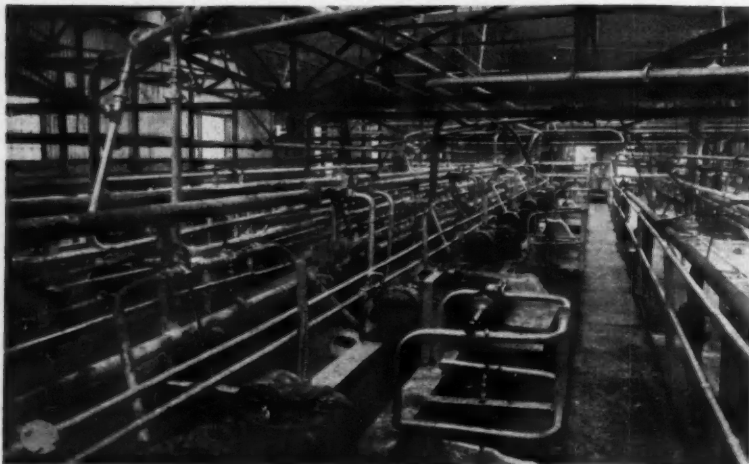
THE successful founding of the International Federation of Societies of Cosmetic Chemists, with seven European countries and the U.S.A. participating, was referred to as a notable milestone at the recent 12th annual meeting of the Society of Cosmetic Chemists.

The following officers were returned unopposed: Dr. H. W. Hibbett, M.Sc., Ph.D., A.R.I.C. (president); Mr. L. S. Smith (hon. sec.), and M. P. Bailey (hon. treas.). Mr. D. F. Anstead, B.Sc., A.R.I.C.; Mr. R. Clark, A.R.I.C., and Mr. R. F. L. Thomas, B.Sc., A.R.C.S., were elected as members of Council.

Microchemical Apparatus Standard Revised

THE B.S.I. has published revisions of Parts B2, D3 and H1 of B.S.1428, 'Microchemical apparatus.' B.S. 1428: Part D3, 'Micro-nitrometer (Pregl type).' B.S. 1428: Part H1, 'Weighing vessels for micro-chemical analysis.'

Copies of these publications may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1. B.S. 1428: Parts B2 and H1 price 3s each, Part D3 price 4s.



Seen here at the Treforest factory is the plant in which the di-calcium compound is precipitated from the phosphate liquor by adding lime at a carefully regulated rate

British Firms Show Chemicals and Equipment at New York Exhibition

A NUMBER of chemical manufacturers, and suppliers of materials and equipment to the chemical industries, are currently exhibiting their products at the British Exhibition which is being held in New York from 10 to 26 June.

Among them are Imperial Chemical Industries Ltd., whose stand reflects the company's pride at being one of the largest industrial organisations in the British Commonwealth and the second biggest chemical company in the world. Showpiece of their stand is a giant molecular model encased in a Perspex sphere, while engraved Perspex panels describe in abstract form specific I.C.I. achievements in medicine, agriculture, textiles, nuclear engineering, plastics and petrochemicals.

Information issued by I.C.I. in connection with the exhibition reveals that the company, with assets of more than £600 million, operates more than 100 factories, employs 110,000 people and makes some 12,000 products, in Britain alone. In addition there are subsidiary and associated companies in 44 countries. Since 1948 I.C.I. have spent about £400 million on new plant or additions to existing plant in Britain alone, while it has 4,500 research workers, engaged in more than a dozen groups of laboratories, on the search for new products.

'Chemical Age'

Great interest was shown in copies of CHEMICAL AGE exhibited on the stand of the Periodical Publishers' Association and extra copies were flown out to New York this week to cope with demand.

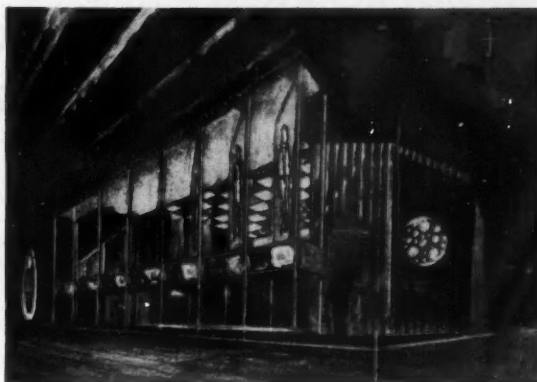
Pye Ltd., Cambridge, are showing a variety of electronic and other equipment. Specialised products include the argon chromatograph for rapid analysis of gaseous mixtures and liquids, and an oil-cooled type of vibrator.

Two "biggest ever" items shown by Q.V.F. Ltd., of Fenton, Stoke-on-Trent, are an all-glass condenser with an area of 60 sq. ft. and a glass flask with a capacity of 200 litres. Other exhibits include an 18-in.-column, 40-ft. high absorber or wash-tower; a 200-litre distillation unit (a specially designed gin still); a standard distillation unit; and a standard climbing-film evaporator.

Visitors to the stand of the Morgan Crucible Co. Ltd. have the opportunity of seeing a working muffle type electric furnace, fitted with Morgan Crucilite silicon-carbide electric furnace elements. Also on show will be Purox recrystallised alumina oxide refractories of high purity for high temperature applications, and Morganite heavy-duty resistors for high voltage circuit breakers and transformers.

Besides power cables and accessories,

Artist's impression of the I.C.I. stand at the British Exhibition



British Insulated Callender's Cables Ltd. are showing products of other members of their group, including thermoplastic sheeting for fabrication and vacuum forming, thermoplastic powders for dip-coating, and a special heat- and pressure-sensitive adhesive for coating foils and papers used in the packaging of food and drinks, all these being produced by Telegraph Construction and Maintenance Co. Ltd. Other products on this stand include flexible plastic couplings, designed for the submarine transmission of oil and gas.

The display of the Mirreles Watson Co. Ltd. is mainly a working, scale model of a turbine-driven cane-crushing mill, representing the last in a train of

mills capable of crushing at least 5,000 tons/day of cane. Descriptive matter on the stand concerns centrifugals, vacuum-creating plant, pumps and distilling plant.

Amongst the many other exhibitors are Associated Electrical Industries Ltd., the Beecham Group Ltd., British Drug Houses Ltd., Dunlop Rubber Co. Ltd., Griffin and George (Sales) Ltd., Johnson, Matthey and Co. Ltd., G. B. Kent and Sons Ltd., Lincoln Chemicals Ltd., and the Triangle Valve Co. Ltd.

The exhibition, jointly sponsored by the Dollar Exports Council and the Federation of British Industries, is believed to be the biggest foreign trade show ever staged in New York.

British Ambassador Opens S.I.M.A. Exhibition in Moscow

EXHIBITION of British instruments organised by the Scientific Instrument Manufacturers' Association was due to be opened at the Polytechnical Museum of Moscow on Friday 18 June by the British Ambassador, Sir Patrick Reilly. Two special lectures will be given by British scientists on visit to Moscow during the exhibition. Professor R. V. Jones, Aberdeen University, will speak on 'Some developments of the optical level' on 22 June and Professor J. C. Tatlow, Birmingham University, will speak on 'Recent developments in the field of organic fluorine chemistry' on 24 June.

In addition throughout the exhibition a series of lectures by Sima members will cover spectrophotometry, pressure measurement, ultra-pure water, electronic instruments, foodstuffs analysis, analytical instrumentation, including gas chromatography, spectrochemical analysis, flame photometry, X-ray fluorescent analysis, pH measurement, conductivity, etc.

The following are the exhibitors:

Airmec (signal generators); Avo (measuring instruments); Baird and Tatlock (laboratory apparatus including Analomatic range for automation in chemical analysis); Beckman Instruments (precision potentiometers); Cambridge Instrument (laboratory and industrial instrumentation); Cossor (electronic laboratory equipment);

Dynatron (nucleonic and radioisotope techniques); Daw Instruments (measurement, analysis and recording of sound and vibration); Edwards High Vacuum (vacuum pumps and vacuum coating unit for electron microscopy); Ekco Electronics (nuclear instrumentation system); Electronic Instruments (pH measurement and equipment for automatic chemical analysis); Electrothermal Engineering (heating mantles and jackets); Elga Products (ion exchange apparatus); Elliott Bros. (medium speed, solid state, general purpose computer); E.M.I. Electronics (closed-circuit TV); Evans Electro Selenium (instruments using photoconductive devices).

Firth Cleveland Instruments (tank gauges and flow meters); A. Gallenkamp and Co. (ovens, calorimeters and furnaces); Griffin and George (automatic g.l.c. equipment and general laboratory-ware); Hilger and Watts (emission spectrographs, etc.); Labgear (nuclear instrumentation); Joyce Loebl (micro-densitometers); J. Langham Thompson (high speed cameras); Marconi Instruments (measuring and X-ray equipment); Measuring and Scientific Equipment (high-speed centrifuges); Mervyn Instruments (square-wave polarograph); Mullard Equipment (instruments for data processing, etc.); Nash and Thompson (scintillators, plastic phosphors, etc.); Negretti and Zambra Ltd. (automatic temperature, pressure and level measurement).

W. G. Pye (chemical instrumentation and pH equipment); Quickfit and Quartz (interchangeable laboratory glassware); Racal Instruments (counting and recording equipment); Rank Cintel (timing equipment, metal detectors); W. Bryan Savage (vibrators); Sigma Instrument (measuring and inspection apparatus); Solartron (data recording and processing); Stanton Instruments (precision and analytical balances); Taylor, Taylor and Hobson (lenses and optical systems); 20th Century Electronics Ltd. (radiation detectors); Unicam Instruments (spectrophotometers).

More Drugs and Medicines Freed from Purchase Tax

THE Treasury have made an Order under the Finance Act, 1948, Sect. 21, entitled The Purchase Tax (No. 3) Order, 1960 (Statutory Instruments No. 968). The Order extends the Schedule of essential drugs and medicines exempt from Purchase Tax under the Purchase Tax (No. 1) Order, 1960, as amended by the Purchase Tax (No. 2) Order, 1960, which are revoked.

New items exempt from tax and extensions of existing items (which are shown in *italics*) are as follows:

Head I. Any one of the following substances, prepared for use by injection:

Aqueous solutions of amino acids with vitamins and mineral salts, whether with or without one or more of the following substances, that is to say, sorbitol, casein hydrolysate, glucose and ethanol;

Head II. Aluminium glycinate, whether or not mixed with either or both of the following substances, that is to say, magnesium carbonate and magnesium trisilicate;

4-tert-Butyl-2-chlorophenyl methyl methyl-phosphoramidate;

2-o-Chlorobenzyl-thio-4-dimethylamino-5-methyl-pyrimidine hydrochloride;

Chlorthenoxazin mixed with phenacetin;

Cyclophosphamide;

Dequalinium Salts, 1-alkyl-4-aminoquinolinium salts, and mixtures of these substances;

3:3'-Diamidinocarbaniide, and salts thereof;

2:4-Dichlorobenzyl alcohol with amyl-m-cresol;

1-p-Hydroxyphenyl-2-(1-methyl-2-phenoxy-ethyl-amino)propan-1-ol hydrochloride;

Inproguone, and the 3:6-dimethoxyethoxy analogue;

Metformin;

Quaternary cationic detergents, with bactericidal activity, and mixtures of two or three of such substances;

2,3,5-Tri-(1-aziridinyl)-1:4-benzoquinone;

Head III.

Diethylaminoethyltheophylline camphorsulphonate;

alpha-Ethyl-alpha-methyl-succinimide;

Furazolidone, and its 5-morpholinomethyl derivatives;

Guanethidine sulphate;

N-Methyl-5-methylazadecylamine methobromide, in a polymerised form;

Pentaerythritol tetranitrate, whether or not mixed with glyceryl trinitrate;

Phenazocine, and salts thereof;

Piperazine adipate and piperazine citrate;

Piperazine, and salts thereof, prepared for anthelmintic use; (Transferred from Head II).

Sennosides A and B, and salts thereof; preparations of senna fruit standardised in terms of sennosides A and B;

Sulphinpyrazone;

Thioridazine, and salts thereof;

Any antimicrobial substance being:—

(a) a substance synthesised by bacteria, fungi or protozoa; or

(b) a substance the chemical properties of which are identical with, or similar to, any substance within paragraph (a) above; or

(c) a salt or derivatives or a salt of a derivative of any substance within paragraphs (a) and (b) above; or

(d) any substance within paragraph (a), (b) or (c) above mixed with one or more of the following substances, that is to say, NN'-di-(4-amino-2-methyl-6-quinolyl) urea hydrochloride, kaolin, parahydroxybenzoic esters, quaternary ammonium bactericides and salicyl alcohol.

Head IV. Vaccines prepared from attenuated strains of poliomyelitis virus.

All vaccines have now been re-grouped under this Head.

All drugs and medicines previously exempt under the revoked Orders remain exempt under the new Order but certain of the drugs now appear under the name approved by the British Pharmacopoeia Commission.

Copies of the order are obtainable (Price 6d net, by post 8d) from H.M. Stationery Office, York House, Kingsway, London W.C.2, and branches.

Fisons Cut Fertiliser Prices by £1 a Ton

PRICES of Fisons agricultural fertilisers are being reduced for the third successive year.

From 1 July all compound fertilisers will be an average of over £1 a ton cheaper. Fisons 41, the most widely used compound fertiliser will be cut by 25s a ton. Superphosphates will also cost less—triple superphosphate by as much as £2 7s 6d a ton.

The company state that "Further modernisation of fertiliser manufacturing plants and a significant increase in the consumption of compound fertilisers in Britain, enabling factories to work to full capacity, have made the new price reductions possible".

More substantial rebates will be offered as early delivery incentives and these, combined with the lower prices, would save farmers nearly £1 million in 1960-61.

B.C.P.M.A. Publish 'British Chemical Plant'

FIFTEENTH edition of 'British Chemical Plant', illustrated directory of the British Chemical Plant Manufacturers' Association—that for 1959—has now been published after a serious delay owing to the printing dispute last year. It is double the size of the first post-war issue.

The products of 248 members-firms are classified under nearly 1,400 headings and sub-headings. Six thousand copies of this comprehensive and authoritative guide to British chemical plant have been printed. A limited number of copies are available free of charge to meet requests from firms not on the B.C.P.M.A. mailing lists. Applications should be made to Mr. J. L. Good, secretary, at 14 Suffolk Street, London S.W.1.

More Oil for Chemicals

U.K. oil consumption during the first three months of this year totalled 11,218,835 tons—more than 1 million tons higher than in the previous quarter and 2 million tons (or 21.7%) above that for the first three months of 1959.

These figures appear in a bulletin from the Petroleum Information Bureau, who, after giving details of various increases in consumption for aviation and motor spirit, lubricating oils, etc., reveal that 'other products'—largely chemical feedstock and light distillate feedstock for gasworks—showed, at 517,505 tons, an increase of 64.5% over the first three months of 1959 (314,546 tons).

Shell Tanker Converted to Liquid Gas Carrier

The 10-year-old Shell oil tanker, "Gyrotoma" has been converted to carry liquid propane gas in high-pressure steel containers, as well as her normal oil cargoes. A total of 22 steel 'bottles'—12 ft. and 14 ft. in diameter and weighing up to 37 tons each—have been fitted into the vessel's main cargo tank space. The ship will trade from Gardon to Venezuelan coastal ports carrying 747 tons of propane and 5,671 tons of oil.

Professor Frazer Calls for U.K. Food Biological Testing Station

THE opinion that it was absolutely essential that a Biological Testing Station should be set up in U.K. was expressed by Professor A. C. Frazer, Professor of Medical Biochemistry and Pharmacology at Birmingham University, when he gave his presidential address to the British Food Manufacturing Industries Research Association. The type of station the professor visualised would not only test food compounds and carry out investigations, but also act as an information centre.

Professor Frazer said that food additives could be divided broadly into three types. Firstly, the residues from agricultural chemicals which, as their effectiveness in most cases is due to some biological action, are a matter of some concern. Secondly, the contamination of food by traces of metals and other substances from the various processes of food manufacture and packaging. Lastly, there is the question of intentional additives, such as colouring, flavouring, preservatives, antioxidants and so on. Although it was generally accepted that

the use of additives in the food industry is essential it is also agreed that it is unethical to use such substances to conceal inferiority.

It is an unfounded, although widespread belief, that anything natural is safe and anything synthetic is suspect, but nevertheless the use of any particular additive should be carefully investigated, not only from the point of view of the nature of the chemical itself but also from the effects it might have on the food, from a nutritional standpoint for example.

Facilities for the investigation of additives which are available in universities and elsewhere, appear to be adequate at the present time but the Professor doubted if they would remain so for long. It is in the light of this, and the fact that the tremendous amount of information about food additives which is accumulating and requires some sort of central clearing house, that Professor Frazer believed the establishment of a Biological Testing Station is of the utmost importance.

Overseas News

BIG MARKET SEEN FOR NEW POULTRY DRUG DEVELOPED BY ARIES AND D.C.L.

DEVELOPMENT of mepyrium, a new drug said to be the first truly effective means of combating coccidiosis (a poultry disease which when uncontrolled kills one chicken out of every eight), was disclosed last week by Dr. R. S. Aries, Aries Associates (Stamford, Conn. U.S.), at the annual meeting of the Canadian Institute of Chemistry.

The new product can be utilised either as a feed additive to prevent occurrence of coccidiosis or as a drug to cure the disease. The firm which pioneered on research for the compounds used in the synthesis of mepyrium, licenses the commercial processes by which the materials are made.

Mepyrium is an amino pyrimidine rendered soluble by quaternisation with picoline. It is made from readily available petrochemicals such as acrylonitrile, butyronitrile, and alpha picoline. Its full chemical name is 1-(2-propyl, 4-amino, 5-pyrimidyl methyl)-2-methylpyridinium chloride hydrochloride. As a coccidiostat the drug is unique in its water solubility properties and can be added to the feed or water fed to poultry.

Aries Associates began searching for a potent drug to control coccidiosis 10 years ago. With the cooperation of the Distillers' Company Ltd., commercial processes were perfected for the manufacture of alpha picoline and other alkyl pyridines now used in the synthesis of mepyrium. Work on the synthesis of mepyrium was aided by extensive studies in pyrimidine chemistry—primarily with sulphas and B vitamins and, more specifically, with analogues of B₁.

World market potential of mepyrium is estimated to be \$30 million a year. The North American market is estimated at over \$20 million and growing at the rate of 11% annually, while yearly market growth for the rest of the world is figured at 15%. Dr. Aries believes that the North American market could absorb 3 million lb./year, the figure being based on the addition of 125 grammes of product to a ton of feed.

Hooker to Build Phenol Plant in Northern Kentucky

Plans for a new multi-million dollar plant in northern Kentucky to produce synthetic phenol are being laid by Hooker Chemical Corporation, whose Durez Plastics Division will operate the plant. The 165-acre site for the plant is three miles west of South Shore, Ky. on the Ohio River about five miles upstream from Portsmouth, Ohio. Construction of the plant will begin later this year with completion anticipated by the end of 1961. Other facilities for this site are in the preliminary planning stage.

The new Hooker phenol process will be used. This process is the result of

research and development work on the Raschig process now utilised by the Durez Division at its North Tonawanda, N.Y., plant.

Rumania Raises Capacity for Sulphuric Acid

The Navodari Chemical Combine in Rumania is to be extended. At present a large sulphuric acid plant is being constructed there and by the end of 1961, Navodari will be producing 150,000 tonnes of sulphuric acid and 450,000 tonnes of superphosphates annually. The equipment to be used for superphosphate production will be the first of its kind to be manufactured in Rumania.

Plant Shortages Delay Polish Start-ups

According to a statement by the Polish Under-Minister for the Chemical Industry, the opening of chemical plants is at present being held up in Poland by shortage of constructional supplies, particularly electrical material. The opening of new chemical plants at Tarnow and Oswiecim has been held up for months due to this cause and the start of operation of a chemical plant in Bromberg and a pharmaceuticals factory at Tarchomin is "endangered." The Under-Minister said that initial planning was sometimes to blame; "to keep up with schedules," he admitted, "construction of plants must sometimes start before plans are completed."

U.K. Proposals for Development of Israel's Minerals

Sir Ben Lockspeiser, president of the Technical Advisory Council to the Israeli Government, has laid a list of recommendations for industrial projects before the country's Ministry for Development. The programme urges the financial support of work in the Dead Sea area and the building-up of production capacities of 400,000 tonnes of potassium annually in addition to the 150,000 tonnes now produced, as well as 80,000 tonnes of table salt annually, 60,000 tonnes of magnesium oxide and an additional 5,000 annual tonnes of bromide and bromide compounds. This latter can, says the report, be produced on the Dead Sea more cheaply than anywhere else in the world since investment costs are low and reserves exceptionally great. The plan would cost some £1100 million.

Site Chosen for Argentine Synthetic Rubber Plant

The \$60 million plant that the Fish International Co. plan in the Argentine for the production of synthetic rubber,

fertilisers and other products is to be built near San Lorenzo, Santa Fe.

Fertiliser Plants for Columbia

Aproquai are to install a 150 tons/day nitrogenous fertiliser plant at Cartagena, Colombia, at a cost of \$12 million. Construction will proceed simultaneously with the erection of an ammonium nitrate plant International Petroleum intend to build at a cost of about \$13 million.

Tenders Sought for Indian Fertiliser Plant

The Indian State of Andhra Pradesh seeks tenders for the supply of a complete fertiliser plant by 30 September. Tender forms are obtainable and must be sent to the Special Officer, Fertiliser Project, Department of Industries, Government of Andhra Pradesh, Hyderabad, India. The plant is scheduled to have an annual nitrogen capacity of 80,000 tons.

Mexican Government's Offer to Nitrogen Producers

The Mexican Government has declared desirable the production in Mexico of liquid and gaseous nitrogen (99.99%). Any firm wishing to start such production in Mexico will be allowed reductions of from 50 to 100% in import duty on the necessary material, complete relief from stamp duty and certain import taxes and reduction of income tax by from 10 to 30%.

More Soviet Chemical Equipment for Satellites

According to East German sources, Russia supplied chemical plant and equipment worth some 150 million roubles to Communist satellite states last year. This estimated figure compares with a total of only 86 million roubles' worth in 1958. Czech Communist Party spokesmen announced last month that the country's chemical industry would be among those unable to fulfil five-year plan targets were it not for Russian co-operation.

Pfizer Plant for Egypt

A contract has been signed between the Government of the United Arab Republic, in Cairo, and Pfizer International, New York, permitting the erection by the U.S. firm of a pharmaceutical plant at Heliopolis near Cairo. The plant is to come into operation during the course of the current year. The operating company is owned 60% by Pfizer and 40% by Egyptian interests.

U.S. Petrochemicals In France

A company bearing the name of El Paso France-Afrique S.A. has been formed with an initial capital of 1 million new francs in Paris for the carrying out of petrochemical activities in France and in the Sahara, possibly in co-operation with other French com-

panies. The new concern is a subsidiary of El Paso Natural Gas Products Co., of El Paso, Texas, itself a subsidiary of El Paso Natural Gas Co., a leading processor and producer of natural gas and of butadiene, styrene, etc.

Linde to Build 22nd Canadian Liquox Unit

Linde Co., division of Union Carbide Canada Ltd., will build a new liquid oxygen plant on recently purchased property in Trafalgar Township, near Oakville, Ontario. When completed, the new operation will be Linde's second largest plant in Canada. The company's 22nd plant, the Oakville unit will produce, in liquid form, oxygen, nitrogen and argon.

Kali-Stauffer Sulphur Plant Due on Stream This Year

A plant in West Germany for the production of insoluble sulphur for the rubber industry, to be operated jointly by Kali-Chemie AG, Hanover, and Stauffer Chemical, New York, is to be brought on stream this year. A new pharmaceutical plant of the Kali concern, now under construction at Neustadt am Rübnerberge, will take over the production by the end of the year of two plants in Hamburg and Munich which will then be closed.

I.C.I.A.N.Z. Pigments Plant to Be Built on Explosives Reserve

The new I.C.I.A.N.Z. £1.5 million pigments plant (CHEMICAL AGE, 11 June, p. 947) is to be built on the Truganina explosives reserve at Altona, Vic. The plant will make a complete range of pigments for the plastics, paint, printing ink and other colour using industries. Components of the plant will be largely Australian.

The storage of explosives at the Truganina reserve will cease soon to make way for the plant. The area of the reserve consists of 330 acres of low lying land. It is understood that the Altona Shire Council is likely to oppose strongly the new pigments industry.

Ammonium Sulphate Project In Morocco

Morocco Authorities and an international group are negotiating an agreement concerning the construction at Safi of an ammonium sulphates plant with a yearly capacity of over 100,000 tonnes.

It is rumoured in Rome that the international group includes Royal Dutch-Shell and E.N.I.

New U.S. Firm to Make TEL and TML

Chatham Chemical Corporation, a new U.S. firm which emerged when Philadelphia-Reading Corp. acquired controlling interest in Chatham Chemical, are planning to become the third U.S. producer of tetraethyl lead. The firm will also make tetramethyl lead and ethylene oxide derivatives. Houston Chemical, a subsidiary of Chatham-Reading, which will carry out these operations, will start construction immediately on the multi-million dollar plants at Beaumont, Tex. The ethylene for the ethylene oxide plant, due on stream late next year, will

be obtained from Mobil Oil's adjacent refinery.

The TEL and TML plants should be completed early in 1962, and Houston say they already have contracts for the sale of TEL to major petrol refiners. Chatham-Reading have bought the anti-freeze and automotive chemicals marketing operations of Commercial Solvents which they hope will ensure immediate markets for Houston's ethylene glycol.

Three U.S. Firms Join in New Fertiliser Venture

A new fertiliser plant, with a capacity of 50,000 tons of solid nitrogen, phosphate and potash fertilisers per year, will be built by a company, yet unnamed, to be formed jointly by the U.S. companies Shell Chemical, Stauffer Chemical and Western States Chemical.

Peruvian Firm to Automate Nitroglycerine Production

Plant of Explosivos S.A., Peru, is to be modified to allow for the automatic production of nitroglycerine. It is stated that the president of an Italian explosives company has visited Peru to advise on the modifications and that a director of Explosivos' West German associates has also visited Peru in connection with plans to extend capacity.

Humble Oil To Raise Butyl Rubber Capacity

Butyl rubber capacity at the Baytown, Tex., plant of Humble Oil and Refining is to be raised a further 20,000 tons to 77,000 tons a year. The expansion should be operating by the second quarter of 1961. Humble Oil also have a 38,000

tons/year butyl rubber expansion in hand at their Baton Rouge, La., plant. When both expansions are completed, the company's butyl rubber capacity will exceed 156,000 long tons/year.

Allied Chemical to Triple Isocyanates Output

With rapidly expanding markets in flexible and rigid polyurethane foams, big potential markets in polyurethane elastomers, and isocyanate-based clear varnishes, Allied Chemical are to triple their isocyanates production to about 25 million lb./year. The large-scale expansion will be made in stages at the Moundsville, W. Va. plant of Allied's National Aniline Division. Construction will start at once and completion is scheduled for the middle of next year.

Canadian Titanium Oxide Plant's Progress

British Titan Products (Canada) have stated that their new \$15 million titanium oxide pigment plant to be built at Tracy, near Sorel, Quebec, is expected to be completed by the summer of 1962.

U.S. Ships \$1 Million Worth of Isobutyl Alcohol to E. Europe

In the first quarter of 1959 the U.S. exported \$2.4 million worth of chemicals to the East European bloc, announces the Department of Commerce, Washington. This total includes \$1 million worth of isobutyl alcohol for the Soviet Union and Czechoslovakia. Applications for exports to the area which were rejected over the period included requests to export synthetic rubber, ion exchange resins, borax and boric acid.

First Canadian Tariff Hearing Scheduled for Sulphur, Acid, Halogens and Carbon Black

FIRST of the Canadian Tariff Board's public hearings on chemicals will be on 12 September and will deal with certain chemical elements. This will be followed by a meeting on 26 September on mineral acids. On 12 September the tariff board, before considering specific headings, will hear any views of a general character concerning the rate structure, nomenclature or other broad considerations relating generally to all inorganic chemicals.

The first hearing will consider: halogens (fluorine, chlorine, bromine and iodine); sulphur of all kinds; carbon, including carbon black, anthracene black, acetylene black and lamp black; hydrogen, rare gases and other metalloids and non-metals (e.g., compressed air, argon, helium, krypton, nitrogen, oxygen, phosphorus, amorphous and yellow, selenium, silicon, tellurium, xenon); alkali, alkaline-earth and rare earth metals, including yttrium and scandium (e.g., barium, calcium, lithium, potassium, sodium, strontium).

The second hearing will deal with: hydrochloric acid, chloro-sulphonic acid and hydrogen chloride; sulphur dioxide and sulphurous acid; sulphuric acid and oleum; nitric acid and sulphonitric acids;

phosphorus pentoxide and phosphoric acids (meta-, ortho- and pyro).

Other hearings will be held as follows: non-metallic compounds; bases and oxides; metallic oxides; metallic halides; metallic salts; other metallic salts; other inorganics; hydrocarbons; hydrocarbon derivatives; alcohols; phenols; oxy-functional compounds; mono-acids, esters; other acids, esters; inorganic esters; amines; other nitrogen functions; organo-inorganics; other organics; fine organic chemicals; fertilisers; tannins; dyes and pigments; paints, putties, inks; surfactants; waxes and polishes; explosives; allied substances; pesticide preparations; specified preparations; other preparations; condensate resins; polymer resins; cellulosics; other high polymers; resin manufactures; other products.

Proposals concerning wording of tariff items and rates of duty should be filed with the Tariff Board, 70-74 Elgin Street, Ottawa, at least 60 days before the hearing to which they relate, while briefs or submissions concerning subject matter should reach the board at least 30 days before the hearing to which they relate, 250 copies of all proposals and briefs are required. Fifteen days' notice is required for those who propose to attend the hearings.

Recent Applications of Analytical Techniques for Small Laboratories

Dr. Milton on Micro Methods

THE newer methods of micro-analysis have been particularly useful in small laboratories where expensive apparatus is not available, where small budgets for personnel are general, and where bench space is always a problem. The cost of chemical reagents is also considerably lessened and this is quite a consideration.*

This tendency has been towards micro-analytical technique in the broad sense of the word. Microanalysis used to be regarded erroneously as the determination of large concentrations of carbon, hydrogen, nitrogen, etc., in small amounts of sample. It is now considered to embrace the determination of small concentrations of substances in relatively small amounts of sample, and the emphasis is away from gravimetric end-points.

EDTA Complexones

EDTA Titrations. Of all the newer methods of titrimetric technique, perhaps the use of complexones of the EDTA type is the most important. Such reagents are particularly suitable for titration of the alkaline earths in a large majority of cases, without prior separation. Such reagents are equally of value in preventing interference of alkaline earths in certain other titrations, but doubtless as direct titrants they have most value. Many new indicators of the Eriochrome black type have been put forward for use with such reagents and research is being carried on continually for elaborating selective indicators in this field. These reagents lend themselves to use with small quantities of unknowns, since sharp end points may be obtained. The end point may be assessed by other than visual means, but in the smaller laboratory, where expensive apparatus is not available, adjuncts to visual aid may be of value. For this reason, the apparatus of Hunter for assessing the end point in EDTA titrations may be recommended. This was described at a meeting of the S.A.C. in 1958 as, in essence, a colour comparator (*Analyst*, 1958, 83.83), whereby the excess colour due to over titration is matched against standard quantity of dyestuff. Calcium and magnesium in small amounts may readily be determined using this apparatus and EDTA. The apparatus, of course, may be widely used for micro titrations quite outside the

original intentions and designs of the originator.

Gas Diffusion Analysis. The work of Conway has made available a most useful technique particularly suitable for the small laboratory. The apparatus is a petri dish with an inner glass ring of sides slightly less than the height of the dish and the whole covered with a glass plate giving a ground fit with the edge of the dish. The technique is applicable to substances which distil or diffuse. The sample is placed in the inner compartment and in the outer is placed a trapping solution or vice versa. The plate is put in position and the apparatus set aside for some hours. The distilled or diffused substance is then measured by the appropriate method.

The method for measuring concentrations of alcohols is to allow the substance to diffuse into a standard sulphuric-chromic solution in the outer chamber whereby the alcohol is oxidised to aldehyde and acid. The excess chromic acid may be titrated with iodine-thiosulphate. Aldehyde may be diffused into bisulphite solution where it is fixed as the bisulphite compound. The bisulphite solution is titrated with iodine to starch end point. Acid phosphate is then added to liberate the bound HSO_3 which is then titrated with iodine.

Ammonia Titration

Ammonia diffuses into standard boric acid and is titrated appropriately. This method is used for total nitrogen (after micro Kjeldahl) and urea, after conversion with urease.

Chloroform may be determined by the Fujiwara reaction with pyridine and alkali after diffusion into toluene.

Carbon monoxide may be diffused from blood, etc. (after the addition of sulphuric acid), and absorbed into palladium chloride solution, excess of which may be found by iodometric titration.

The Conway apparatus uses very small amounts of substances and end points are microtitrations using specially constructed microburettes. The disadvantages are (a) the extreme micro-scale (and apparatus), (b) the slow rate of diffusion which does not allow of complete separation of the liberated substances. This means that all methods must be carefully standardised against time and temperature, and the construction of calibration curves made for each method, using known amounts of pure substances. (c) The small head space to allow of diffusion.

The Cavett apparatus does not suffer from these drawbacks. This apparatus, originally designed for the determination

consists of a small wide mouth Erlenmeyer flask, with a ground-in stopper, which carries a small glass cup which acts as the container for the substance to be analysed. The trapping liquid may be placed in the bottom of the flask. Hooks on the stopper and flask allow spring clips to be applied to prevent the stopper from lifting.

The chief advantage of the Cavett apparatus is that it allows of gas diffusion analysis on a much larger scale and also that the flask may be heated. This speeds up the diffusion rate which means not only that the analysis may be completed relatively quickly but that the reaction goes to completion and therefore calibration of the method is not necessary. The details of methods using the Cavett apparatus were published by Dr. Milton in *Laboratory Practice*, August 1954, p. 318.

Solvent Extraction

Solvent Extraction Methods. Diethyl-dithio carbamate in solvent is used to extract metals of the Group II and IIIb from aqueous solutions. This reagent means that the messy, laborious and unpleasant use of H_2S may be largely dispensed with. Techniques for separation of copper, lead, cadmium, arsenic, etc., originally put forward by Strafford Wyatt and colleagues have found extensive application and have been much extended.

Dithizone has also been used in this connection, since this reagent in chloroform, carbon tetrachloride and toluene allows of separation of a mass of metals from solution; which may then be individually separated by addition of other complexing reagents such as citric, thiosulphate, cyanide, etc.

Rubeanic acid in solvents will also allow of extraction of a wide range of metals but rather more selectively than dithizone.

Oxine (8-hydroxyquinoline) in chloroform solution will separate at least 43 metals from aqueous solution. This reagent may be quite useful to bring about preliminary separations and to concentrate the metals required to be determined. The chloroform solution may be ashed and the more selective techniques of separation applied to the residue.

More selective extraction can be brought about by using more selective reagents or by working on certain systems, e.g., nitrate, cyanide, citrate which complex preferably to the oxine. More selective reagents are: Rhodamine B. for antimony; dipyrldyl for iron and copper; dimethylglyoxime for nickel; benzoin oxime for molybdenum and tungsten; neocuproine for copper.

Ion Exchange Analysis. Total ions in

* This is a summary of a paper on recent applications of analytical techniques more suitable for the small laboratory given at the recent Spring course of the Birmingham and Midlands Section, Royal Institute of Chemistry, by Dr. Reginald F. Milton, B.Sc., Ph.D., F.R.I.C., consulting biochemist.

solution may be determined by alkali-metric titration. The solution is poured through an ion-exchange column containing a cation exchange resin and the cations are exchanged for hydrogen ions.

It is not necessary for the salt to be soluble in water. An aqueous suspension of the salt poured into a cation exchanger filled with sulphonic acid resin, will allow of reaction so that the cation is taken up, liberating an equivalent of H^+ ions which may be titrated. These procedures may be used for SO_4 in alum solutions, etc.; nitrate in explosives; total base in blood serum; halides in sea water and brine solution; phosphates in insoluble calcium phosphate; borates in liquors; salts in tanning or plating liquors.

This technique is most valuable in analysis of compounds containing iron, aluminium and alkaline earths, together with phosphates. The compound is dissolved in dilute acid and passed into the cation exchanger in acid form. The phosphate is in the effluent on water washing and may be determined, and the metals are fixed on the resin bed. Treatment of the resin bed with acid will allow of recovery of the metals for normal analysis without phosphate interference.

Cation Exchangers

Cation exchangers are of the type: R_3COOH and R_3SO_3H (attached to phenolformaldehyde or similar resins).

Anionic exchangers are: amino or quarternary ammonium groups of the type NH_2 , NHR , NR_2 , NR_3^+ .

Other applications of column absorption technique are: thiamine, zeolite absorbent; vitamin A and carotene, bone meal absorbent; alkaloids from plants, acidite resins.

Paper Chromatography is one of the most useful of all modern applications in the small laboratory for both organic and inorganic separations and analyses, following the work of Martin and Synge. Working is always in the micro range. Apparatus is simple and cheap and consists of a few beakers, troughs and home-made frames only.

Use may be made of (a) one dimensional separation; and (b) two dimensional separations; and the method may involve ascending or descending chromatography according to whether the solvent front passes up or down the paper.

Solvent mixtures are used to assist in giving diffusion separation and the substance on the paper is finally identified by use of the location reagent.

One of the most generally useful solvent mixtures for inorganic separations is the MEK: HCl: H_2O system, originally used by Hunt, North and Wells for use with mixtures of Ni, Co, Cu, Fe. These metals have Rf values of approximately 0.1, 0.4, 0.6 and 1.0 respectively.

Further investigations have shown that Zn. (0.75) Hg^{++} (0.9) Cd (0.8–0.8) and manganese (0.2–0.3) can also be separated from suitable mixtures using this system.

A further use for this same system is in the determination of Mo. Mo travels with Fe in the solvent front. After separation, the Fe. zone may be cut out

and treated with thiocyanate/ $SnCl_2$ solution in dilute HCl, in the presence of an organic extractant such as ether or butyl acetate. The red $FeCNS$ will be decolourised by the $SnCl_2$ and the orange Mo complex is extracted into the solvent and may be assessed by visual matching against standards.

Many colorimetric reagents are available for use in inorganic chromatography, among which perhaps the most generally useful are rubeanic acid (Cu, Co, Ni): dithiozine which gives colours with most common metals, and sodium pentacyano-amino ferroate/rubeanic acid reagent. (Herrington, *Analyst*, 78, 174 and 81, 499) which is equally sensitive and even more widely applicable. 8-Hydroxyquinoline may also be used in many cases and is particularly useful for the alkali metals, viewed under u.v.

For amino acids one of the best separations is obtained by using two-way chromatography. First run is with butanol/pyridine (butanol 60: pyridine 60: water 60) and second run is with phenol/ NH_3 (liquid phenol 200: NH_4OH 1).

Ninhydrin is a most useful general

location reagent. Others in common use are—Isatin, Erlich's and sulphanic acid.

Barbiturates may be separated by a number of systems usually incorporating butanol ammonia and water. Perhaps one of the simplest and most useful is the $CHCl_3/NH_3$ system whereby the chromatography tank is saturated with NH_3 , and chloroform is used as the developing solvent. Both $CHCl_3$ and NH_3 should be placed in the closed tank the $CHCl_3$ in the trough and the NH_3 in the tank-bottom for three hours before the paper is introduced.

An excellent general location reagent is 1% $CoNO_3$ in acetone; colours develop on exposure to NH_3 . These colours fade, but are restored on re-exposure to NH_3 .

Many alkaloids can be effectively separated chromatographically, using butanol: water and 1% citric acid (1:1) on a paper impregnated with NaH_2 citrate. Using this system, the following have been separated in this order: morphine, codeine, strychnine, citropine, cocaine, quinine, pethidine, amidone. Location reagent iodo platinate gives blue spots. (45 ml. 10% Cl: 5 ml. 5% platinic chloride: water 100).

Taking the 'Stinks' Out of Chemistry

THE recently opened Edward Goodrich Acheson Hall of Chemistry at the University of Buffalo, State of New York, brings some new ideas to the university laboratory, writes Mr. Edward A. Smith, executive manager of Acheson Industries (Europe) Ltd. Financed by the Carborundum Company, and by members of the Acheson family, this chemistry block has been named to honour the achievements of Dr. Edward G. Acheson. He invented Carborundum and also found an industrial method of making the purest graphite in the electric furnace, in the closing decade of the nineteenth century. His subsequent work on colloidal graphite led to his forming the British company in 1910, now known as Acheson Colloids Ltd.

The Hall, with 82,000 sq. ft. of laboratories, maintains a slight positive air pressure in the corridors, to ensure that laboratory fumes do not trespass. The whole block is clean cut and makes full use of natural lighting giving an air,

almost of exuberance, rather than weighty scientific learning.

Interesting features are incorporated into the undergraduate laboratories, such as all-glass plumbing beneath the benches. Most impressive, however, are the down draught fume hood on the benches, one of which is shown in the accompanying illustration. The absence of traditional glazed fume cupboards makes for a cleaner overall appearance. When Mr. Paul Cohen, the Michigan attorney, took me over the Hall, at a stage nearing completion, in the early summer of 1959, he pointed to the use of modern metals in the architectural features, such as hand-rails on stairs, the careful use of woods, all of which combined to take the 'stinks' out of chemistry. I was so impressed with the block of laboratories that I asked Professor Gordon M. Harris to let me have some photographs, and I would like to thank him for the accompanying illustration.

EDWARD A. SMITH



Downdraught fume hood on one of the benches at the Edward Goodrich Acheson Hall of Chemistry

LABORATORY EQUIPMENT REVIEW

★ New Apparatus for Research and Industry

This annual 'Chemical Age' survey of laboratory equipment features apparatus and instruments that have recently been introduced, redesigned or modified. It also features pilot-scale equipment. Firms exhibiting at the Laboratory Apparatus and Materials Exhibition, opening at the R.H.S. New Hall, London, on 20 June are indicated with the stand number shown at the end of the description of their exhibits

★
For further details of any apparatus reviewed complete and return Reader Enquiry Service form on page 1044

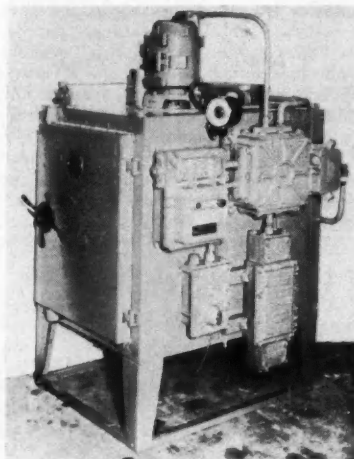
Ampoule Filler

Available from Adelphi Manufacturing Co. Ltd., 20 Duncan Terrace, London N.1, is a range of laboratory and industrial equipment which includes an ampoule sealer and filler designed for sealing relatively small batches efficiently and rapidly. It incorporates an oxygen supply line, with the advantages of being usable on town gas supplies or bottled gases.

Other items of equipment supplied by the company are an ampoule washing machine; vial and bottle filling machine, chemical mixer, powder screening and blending machines, bottle washer, etc.

New Laboratory Ovens

Two new laboratory ovens, one manufactured to Buxton Group II specification (flameproof) and suitable for drying where an inflammable solvent has been used, are being made by A.E.W. Ltd.,



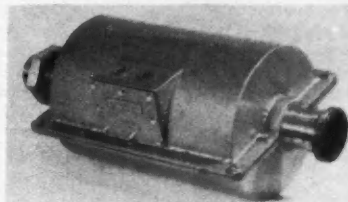
A.E.W. flameproof oven

Imperial Works, High Street, Edgware, Middlesex.

The company's range includes units for temperatures up to 700°C, and automatic control is fitted as standard. Forced air circulation is provided by a synchronous electric motor fitted in the top of the oven chamber and both exhausts and recirculates air in the oven. Both industrial and laboratory types are available.

Induction Flowmeters

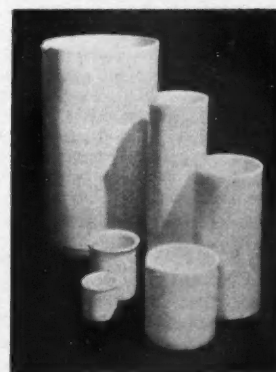
Recent developments from Altis Instruments (Great Britain) Ltd., Brimscombe, Stroud, Glos, include a range of induction flow meters suitable for metering liquids in pipelines down to 1 mm. in diameter. These small instruments are "as accurate as the larger Altoflux flowmeters ($\pm 1\%$ of instantaneous reading)" and are transmitting type instruments, suitable for inclusion in control loops, of considerable interest to laboratory technicians.



Autoflux detector head

Illustrated is a detector head with type RJT A.P.V. stainless steel fittings, and the company also supply the type SP end fittings.

P.T.F.E. Beakers



Latest p.t.f.e. products from the fluorocarbons department of the Radio and Electronic Components Division of Associated Electrical Industries Ltd., 155 Charing Cross Road, London W.C.2, are a range of beakers for use in chemical laboratories and industry where corrosive substances are handled. Standard sizes range from 40 mm. (1.575 in.) internal diameter and 50 mm. (1.969 in.) internal depth to 7½ in. internal diameter to 15 in. internal depth

Vinyl Flooring Materials

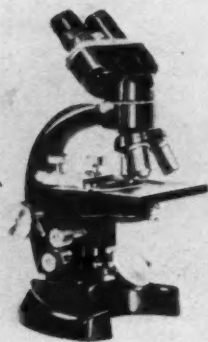
A comprehensive range of vinyl flooring materials is manufactured by Armstrong Cork Co. Ltd., Bush House, Aldwych, London W.C.2, two of which are recommended for laboratory use. Custom Corlon tile and vinyl Corlon sheet materials are produced in a number of patterns and styles, while a more expensive opalesque tile is said also to be suitable, but more appropriate for 'prestige' installations. Details and advice may be obtained from the company's flooring specialists.

Stereo Microscope

Both stereo and mono microscopes of modern design are available from Britex (Scientific Instruments) Ltd., 329 High Holborn, London W.C.1.

The Stereoxem, illustrated, on a non-inclinable stand, with deep-throated limb to accommodate large objects such as

LABORATORY EQUIPMENT REVIEW



Stereoxem microscope

petri dishes, etc., is finished in black satin anodising with chrome controls.

A 4½ in. square corrosion-resistant stage is provided, reinforced to prevent whip when used at high magnifications. It has provision for stage clips or mechanical stage, and is suitable for photomicrography. The basic details of design also apply to the Monoxem instrument.

Test-kit for Pentachlorophenates

In collaboration with Monsanto Chemicals Ltd. and Tintometer Ltd., Baird and Tatlock (London) Ltd., Chadwell Heath, Essex, have developed a complete outfit for the estimation of microgram quantities of sodium and copper pentachlorophenates in water. It is possible to estimate to ± 3 p.p.m. the pentachlorophenates content of water samples containing between 5 and 100 p.p.m. of those materials.

Among the latest B.T.L. products is a new bosshead, pressure diecast in a light aluminium alloy. Complex rectangular structures can be built up with accurate alignment. The ring contact of the two lock nuts gives a positive two-point grip and rods up to ½ in. diameter are held rigidly by hand tightening.

B.T.L. products, including a wide range of laboratory furniture, can be seen at the London showrooms, 14-17 St. Cross Street, E.C.1.

Humidity Test Cabinet

The model HTC.2B humidity test cabinet by Barlow-Whitney Ltd., 2 Dorset Square, London N.W.1, is one of the smaller units in the range, for the testing of paints and varnishes, plating finishes, electronic components, packaging, etc.

Performance characteristics include dry heat to 100°C, wet heat to 70°C, relative humidities from 40% to 99% and temperature control limits to $\pm 0.5^\circ\text{C}$ or better. Controlled rapid cyclic temperature variation under damp heat conditions is provided for, with adjustment for amplitude and frequency.

Facilities are built in for the entry of electrical leads to the chamber interior, for the testing of components under

operating conditions, while circulating equipment ensures humidity distribution throughout working space. Stand 53.

Abbe Type Refractometer

Basically the new Abbe type refractometer follows the same pattern as the current production model. It is of general use for examining chemicals, oils, fats, optical glass, etc. In addition to the standard refractive index scale it can also be supplied with a scale reading percentage of soluble solids.

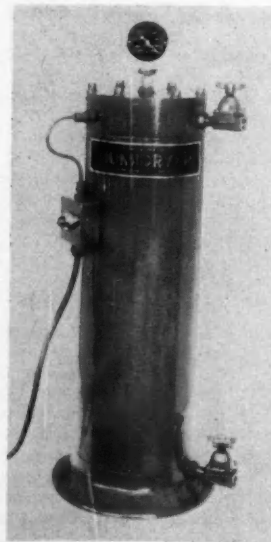
The refractive index of any transparent liquid, plastic or solid body from 1.30 to 1.70 can be readily obtained by direct reading on the scale, to the third, and by estimation to the fourth, decimal place, no calculation being necessary. The partial dispersion, C-F, of the material under examination can be obtained by referring the reading of the dispersion circle (situated on the right-hand side of the instrument body) to tables supplied with the instrument.

On this new instrument, the prism surfaces are always horizontal, and thus it is considerably easier to apply samples to them. The prism box remains stationary during readings, and a further advantage of this feature is that thin fluids do not tend to run out from between these surfaces.

One of the most important features of this instrument, made by Bellingham and Stanley Ltd., 71 Hornsey Rise, London N.19, is the fact that all moving parts, scales, etc., are enclosed within the body.

Laboratory-type Humidifier

The laboratory-type humidifier (illustrated) manufactured by Burnett and Lewis Ltd., Redhouse Industrial Estate, Aldridge, Walsall, Staffs, can be filled with activated alumina, molecular sieves and various other desiccants and used to dry gases and certain hydrocarbon liquids.



Burnett and Lewis Humidifier

The small dryer has been found useful by laboratories for experiments with very dry air for spectroscopy, special instrument systems and even for drying the air in the cavity between two plates of glass being fused together.

Benchmaster Tabling

A type of corrosion-resistant tabling said to be of interest to the chemical industry for laboratory use is made by the Crittall-Aquafont Group Ltd., Trojan Works, 35 Kentish Town Road, London N.W.1.

It is sealed against dirt and is washable, being made up from laminated board with stainless steel bonded to its top surface and galvanised sheet welded to the underside. The steel top is overlapped and turned over the edges of the board, sealing the interior. It may be fastened to steel frames or fitted to existing frames in a variety of sizes.

Laboratory Furniture

At the Laboratory Apparatus and Materials Exhibition, Cygnet Joinery Ltd., laboratory furnishers, Higher Swan Lane, Bolton, will exhibit a wide range of standard units. Also in attendance will be technical and design staff to offer their services and advise on the efficient planning of laboratories for specific requirements. Stand 52.

Detel Coatings

Detel AD grade, an epoxy resin based coating, has been used for some time on refrigerated centrifuges for laboratory use. The coating is extremely hard with a high finish that can readily be sterilised and kept clean. Any mechanical damage can be made good *in situ*.

Detel SR grade is resistant to a wide range of solvents, including trichloroethylene, perchloroethylene, toluene, xylene, white spirit, benzene, butanol, cyclohexanone, amyl acetate and naphtha. Manufacturers are Detel Products Ltd., Stonefield Way, Victoria Road, South Ruislip, Middlesex.

Automatic Titrimeter

The automatic titrimeter by Doran Instruments Co. Ltd., Stroud, Gloucestershire, the basic circuit of which is due to the Shell Development Co., U.S., is a continuously indicating instrument used in combination with an electrometer valve circuit. It not only requires less manipulation by the operator but also enables him, easily and definitely, to ascertain when the potential reaches equilibrium and to follow visually the chemical reaction.

The electrometer circuit is of the single-stage balanced input type, with negligible zero drift when operated under moderate conditions of supply variation. Because of the electrical characteristics of the circuit employed, the meter may be used with safety to measure any potential without previous knowledge of the magnitude or polarity.

New Electrothermal Apparatus

Among the comprehensive range of laboratory heating equipment for flasks,

funnels, beakers, etc., which together with distillation and extraction apparatus, Kjeldahl and micro Kjeldahl apparatus will be shown by **Electrothermal Engineering Ltd.**, 270 Neville Road, London E.7, at the exhibition, will be four recently introduced equipments. These are the electric melting point apparatus, glass tube cutter, precision brazing equipment and immersion heaters.

A full range of surface heaters for temperatures from 100°C to 1,000°C including pipe heaters, heating tapes. Heat-by-the-yard, Thermocord, armoured heaters and a flexible furnace will be shown with industrial heating tapes recently introduced for temperatures up to 1,000°C.

New additions to the Electrothermal range will be electronic thermometers for medical use and electronic measuring instruments for laboratories operating by contact and by infra-red without contact. **Stand 37 & 40.**

Deioniser for Semiconductors

Development section of **Elga Products Ltd.**, Lane End, Bucks, will introduce at the exhibition, a mixed bed deioniser for semiconductor laboratories. The unit consists essentially of a mixed bed Elgalite column, a storage tank, and a recirculating pump. After passage of the crude water through the mixed bed column this is guided through an 0.45 micron filter in series with an activated charcoal bed. From this the deionised and filtered water passes through a u.v. radiation unit and is then finally collected in a sealed receptacle.

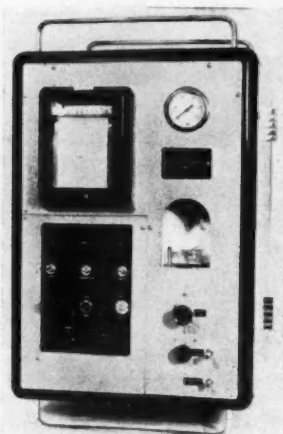
The Elgastat glass washer is a deioniser based on the Elgastat transistor washer. In hard water areas, laboratory glassware has to be dried after cleaning to avoid deposits. The use of deionised water prevents deposits forming, and thereby saves the necessity of drying. The Elgastat glass washer overcomes this objection by recirculating the effluent, with resultant economy. **Stand 1.**

Recording Flame Photometer

The E.E.L. recording flame photometer has been designed by **Evans Electro-selenium Ltd.**, Colchester Road, Halstead, for the continuous monitoring of sodium concentrations in liquid samples. Self-contained, the instrument operates from a town or bottled gas supply. An air compressor with filter on the inlet side is fitted internally.

The instrument is highly sensitive, full scale deflection being obtainable on as little as 0.01 p.p.m. sodium. Three ranges, of approximately one decade, together with an iris control giving a fine adjustment, allow for full scale settings on any desired strength of approximately 10 p.p.m. sodium.

The sample is drawn from a Pyrex glass container maintained full from the sampling line and overflowing to waste. Provision is made for the introduction of standard and blank solutions in other containers for setting up the instrument. Light falls on to a low-noise nine-stage photomultiplier, the output of which is fed, via a suitable amplifier, to a moving



E.E.L. flame photometer

coil pen recorder. A fully stabilised circuit compensates for voltage fluctuations and a signal light is fitted to give high level warning.

Endecotts Micro-sieves

Micro-sieves with apertures down to 18 microns are now being produced by **Endecotts (Filters) Ltd.**, Lombard Road, London S.W.19, the aperture range being 37, 30, 35 and 18. In addition a range



Nest of micro-sieves

of fine-mesh sieves can be supplied in stainless steel, for use with chemicals and reagents that have a detrimental effect on standard sieves. **Stand 45.**

Exelo Glassware

A full range of glass Exelo stopcocks, including several new types, will be exhibited by **W. G. Flaig and Sons Ltd.**, Margate Road, Broadstairs. Apparatus fitted with Exelo interchangeable stopcocks, including burettes, separating funnels and Orsat apparatus, will also be shown.

A new range of volumetric glassware has permanently filled graduations. The range includes burettes, pipettes and measuring flasks. An improved design of measuring flask is a wide necked shorter form than the usual design.

In the Exelo Scholander micro gas analyser the original design has been improved by incorporating special taps

LABORATORY EQUIPMENT REVIEW

in the absorbent reservoirs, and by using a new low-friction polymer for fabricating mercury tight washers. In the light of experience gained with the new instrument, both description and procedure have been modified, although the principle remains the same.

The vacuum desiccator has an improved design of stopcock giving greater strength and reducing breakage risks. The horizontal type pipette allows rapid repetition dispensing of different quantities of liquid. It incorporates a four-way Exelo interchangeable stopcock. **Stand 26.**

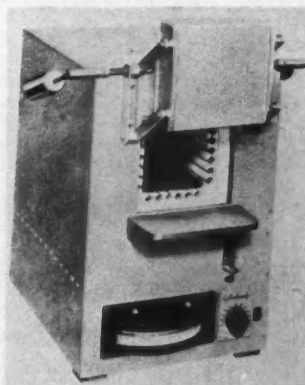
Automatic Flow Curve Recorder

The Ferranti-Shirley cone and plate viscometer, widely used for studying the anomalous flow behaviour of the more complex fluids, has been modified by **Ferranti Ltd.**, Hollinwood, Lancs, to incorporate a new automatic flow curve recorder.

As a result, non-Newtonian flow curves of shear stress against rate of shear can be plotted automatically, eliminating the necessity for constructing graphs by manual methods. In addition, it provides suitable means of standardising the test procedure to minimise operator error due to inconsistent experimental conditions. This is particularly important for the measurement of time-dependent flow properties, e.g., with thixotropic substances where close control of both the magnitude and duration of shear is essential. The recorder is capable of plotting a complete shear stress/rate characteristic in about 10 seconds for most non-Newtonian fluids.

New Gallenkamp Furnaces

A new range of electric furnaces for the laboratory has been introduced by **A. Gallenkamp and Co. Ltd.**, Technico House, Sun Street, London E.C.2. Their furnaces have been restyled and several new types have been added to the range. Operating temperatures have been increased and new types introduced with operating temperatures as high as 1500°C. Larger sizes are now available and furnaces have, in general, greater



Gallenkamp box furnace

LABORATORY EQUIPMENT REVIEW

useful working spaces due to improved design.

The larger Gallenkamp muffle furnaces have been restyled and now have the option of built-in indicating or controlling pyrometers. Like the 'Super Hotspot,' the cases are very ruggedly constructed from asbestolite sheeting which is non-corroding and safe to touch. Sliding doors or counterbalanced swing-up doors are available.

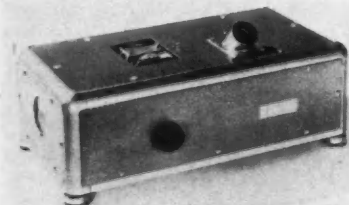
A new box furnace for 1250°C. is built on similar lines to the muffle furnaces but heated by heavy gauge internal spiral elements supported by refractory castings which form a work chamber 6 in. by 6 in. by 12 in. deep. Either manual or automatic control is available. Crusilite elements are used to heat two box furnaces which have a maximum temperature of 1400°C.

New box furnaces for a maximum working temperature of 1500°C. are heated by 'super' elements that can operate at 1600°C. for extended periods in oxidising atmospheres. These elements rest in refractory castings which form a work chamber 7 in. by 7 in. by 12½ in. deep. An exceptionally thick swing-up door is fitted in order to obtain uniform temperature distribution.

New Gallenkamp products include the Unilats range of furniture, universal thermostatic waterbath, shaking incubator and photo-electric colorimeter.

New Garcia Balance

For centralising a small electric motor in a frame, S. Garcia Ltd., 780 Seven Sisters Road, London N.15, have designed a balance that achieves a sensitivity of 20mg/cm. Built on unconventional lines, this instrument retains the fundamental principles of good balance



Garcia's new instrument

practice. The indication is by a projected image system. The beam is fully relieved when not in action and also damped. The instrument is mounted in a metal case finished in silver and green hammer enamel.

Shown in the accompanying photograph, is the instrument designed for this purpose, but different versions can be built to do a variety of similar jobs, quickly and accurately.

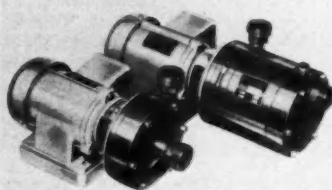
Automatic Instrument Sterilisers

A new range of portable instrument sterilisers introduced by the General Electric Co. Ltd., Magnet House, Kings-

way, London W.C.2, incorporates thermostatic control, a feature previously confined to larger units. One advantage of this control is that although a high load is employed to reduce the preheating time to a minimum, the thermostat operating in a vapour tube ensures that only sufficient current (as little as 15% of the full load) is used to maintain temperature once boiling point has been reached. Another advantage is that no excess steam is produced to damage surroundings.

Inerton Non-metal Pumps

Inerton non-metal pumps, recently introduced by Glen Creston Ltd., 41 Church Road, Stanmore, Middlesex, are resistant to acids, alkalis, oils and alcohols. Of the centrifugal type, the pumps



Inerton non-metal pump

are flange-mounted. Housing and impeller are of rigid p.v.c. The shaft is covered by a sleeve of synthetic carbon, while the seal is an elastic ring-membrane of synthetic carbon and polythene. Maximum working temperature is 60°C.

The Inerton 'P' series has no suction lift and therefore a free access of liquid into the inlet branch. The 'SP' series has a built-in priming chamber enabling liquids to be lifted from below the level of the pump. Suction and delivery branches, except for the smallest model, can be connected to either rigid pipes or flexible hose. Price of the smallest model, including electric motor, is £22 15s.

Also available are carboy and bottle hand pumps, suitable for neck openings from about ¾ in. to 2¼ in.

Benches by Graceline

Benches in the laboratory in the new £150,000 extension to Ferranti's Pilton

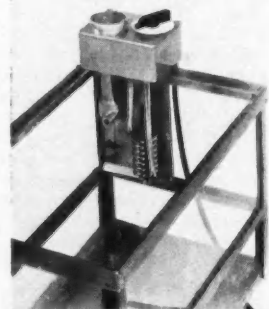
factory, near Edinburgh, which requires stringent conditions of cleanliness to ensure that no dust particles greater than half a micron should be present are surfaced in Opaline green Softglow Formica supplied by a unique process perfected by Graceline Units Ltd., Horton Bridge Road, West Drayton, Middlesex.

This degree of cleanliness is ensured for top secret work on inertia guidance systems for aircraft, submarine and missiles, in particular the construction of gyroscopes.

The special hard-wearing laboratory benches, supplied by Graceline Units have a jointless and edgeless panel to avoid the collection of dust and with humped edges back and front to prevent objects rolling on to the floor. The Formica bench tops were curved by a unique process perfected by Graceline Units.

New Low-temperature Bath

In addition to their standard laboratory water bath, in four different sizes, Grant Instruments (Cambridge) Ltd., Barrington, Cambridge, will exhibit two pieces of equipment for the first time. Their low temperature bath has a range of -25°C. to +65°C. ±0.5°C. with all the features of the standard bath (stainless steel tank, propeller stirring, direct-set-



Thermostatic control unit

ting dial, etc.) and costs £97 10s. A stainless steel heat extractor is built into the bottom of the tank (which measures 18 in. by 12 in. by 9 in.) so that the efficient cooling is obtained without pipes or coils to obstruct the clear working space inside the bath. The bath is heavily insulated, and mounted in the upper half of a trolley, with the refrigeration equipment in the lower half.

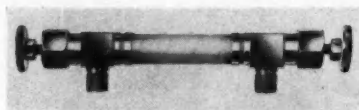


Graceline benches at Ferranti's Pilton works

Also exhibited for the first time is a clip-on thermostatic control unit containing the same components as the standard bath, enabling virtually any vessel to be used as a thermostatic bath. This was originally produced to overcome the high transport and import duty costs involved in exporting complete baths, but is now in considerable demand in this country as well. In basic form it costs £19 10s, but the model illustrated it fitted with the pump circulator available as an extra on both baths and control units at a cost of £3. This enables the control unit to provide a pumped supply of water at a constant temperature, which can be used for circulating round water jackets or other apparatus. **Stand 56.**

New 2 ml. Sampling Bombs

The Hone stainless steel high pressure gas sampling bombs of capacities ranging from 100 ml. to 2.5 l. are well known in the oil and chemical industries. Now the increasing use of chromatographic



Hone 2 ml. sampling bomb

analysis, where only very small samples of gas are needed, has led to the development of a 2 ml. capacity sampling bomb.

This bomb has been thoroughly tested by various sections of these industries over the past 12 months, and has now been added to the existing range of Hone apparatus of this kind with a 7-10 day delivery from **F. J. Hone and Co. Ltd.**, 19 Eldon Park Road, London S.E.25.

These 2 ml. bombs, which are tested to 1,000 p.s.i., are made of a transparent plastics, allowing easy visual check on the liquid level. An antistatic device for safe operation when taking samples of hydrocarbon products has been built into the vessel, which is complete with two fine-control stainless steel needle valves, also designed and made by Hone. **Stand 17.**

Drum Emptying Pump

New from **D. A. Gunn (Engineering) Ltd.**, Park Road North, London W.3, is a drum, barrel and vessel emptying pump. With a fluid transfer performance of 5 gall. in 2½ minutes at a head of 6 ft. it can handle 100 g.p.h. with a normal flow discharge of 120 g.p.h. An attachment is provided for mixing and agitating.

Pump shaft is 16½ in. long, while the pump body will accommodate outlets as small as 2½ in. diameter. All submersible parts are in stainless steel, and the pump is fitted with a ½ h.p. continuous rated capacitor type motor.

New Isomantle Micro-oven

Isopad Ltd., Boreham Wood, Herts, will show the full range of electric heating mantles from the smallest micro type to the largest pilot sizes made for flasks



Isomantle micro-oven

up to 200-litre capacity. All equipment is also available in designs suitable for flameproof area groups II and III.

A new appliance shown for the first time is a micro-oven with a cavity 4 in. diameter and 4 in. deep giving temperatures up to 300°C. and a ventilation rate of 150 changes or 112 litres of air per hour. Another newcomer is the Isomantle extraction unit for Kjeldahl flasks of 300-500 ml. capacity giving high heat concentration up to the 30 ml. level. Also new are lightweight metal-cased Isomantles for flasks from 100 ml. to 1 l.

Exhibits will include Isotapes and jackets for heating of pipe lines and columns and an interesting range of manual and automatic controls both standard and flameproof. **Stand 15.**

Laboratory Cleaner

Suitable for the provision of manufacturing or research conditions which are relatively aseptic and entirely dust free is the Jetstream industrial cleaner manufactured by the **Kent Floor Machine Co. Ltd.**, of Liverpool 24.

The Jetstream is instantly adaptable for the wet or dry cleaning of walls and floors and can undertake a wide variety of other duties where a powerful and mobile suction unit is required.

Retained waste—dry or wet—is housed in a 16 in. diameter tank of 18 gauge seamless construction lined with Plastisol to resist acids, rust and detergents. For use in nuclear research establishments, pharmaceutical laboratories, etc., the Jetstream is fitted additionally with the Kent micro-impaction glass fibre filter, which retains essentially 100% of particles down to submicron size.

E.C.-coated Glass Tubes

A method of applying a very stable electrically conductive film to glass has found many applications in the modern chemical industry. This process evolved by the Corning Glass Works, U.S., is now being performed by **James A. Jobling and Co. Ltd.**, Sunderland, and consists of firing a mixture of metallic oxides into the surface of glass objects at red heat.

This process enables a constant temperature to be maintained over a long

LABORATORY EQUIPMENT REVIEW

length of glass tubing and other apparatus and is cheaper and more robust than other forms of heating elements. The coating is highly resistant to chemical and mechanical attack and can be operated at temperatures up to 350°C.

A recent application is the use of E.C.-coated tubes in an improved method of heating chromatography columns. This has reduced the complexity and increased the reliability of the equipment and is just one example of the many ways in which this very versatile process may be used.

RZR Laboratory Stirrer

A small electrical stirrer for laboratory work with stepless mechanical regulation is the RZR available from **Jones and Stevens Ltd.**, Eastern By-pass Littlemore, Oxford. Six special ranges are provided by high and low-speed shafts, brought into operation by turning the stirrer through 90°. Speed is continuously variable within each of the six ranges. The high speed shaft can be varied between 110 and 1700 r.p.m. and the low speed shaft between 3-45 r.p.m., 7-105 r.p.m., 10-150 r.p.m., 14-210 r.p.m. and 17-255 r.p.m.

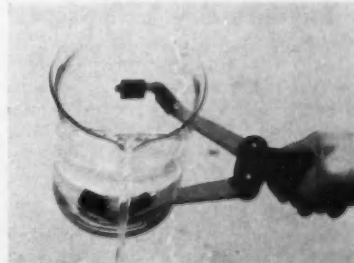
C.T.3. Thermostatic Bath

Newly produced by **Laboratory Thermal Equipment Ltd.**, Greenfield, nr. Oldham, is type C.T.3 thermostatic bath, which has a new temperature control system with no moving parts and an accuracy said to be better than 0.01°C. at 100°C. Operating ranges are either 10°C. to 70°C., or 70°C. to 130°C.

Stainless steel interior is surrounded by a strong outer case. Large double glass panels are set in a neoprene moulding with a 1½ in. dry air cavity between. The seal between the bath and the heat-resisting inner glass panel is by a silicone rubber gasket. The bath is heated by a specially designed immersion type heater with low-energy dissipation per unit length and of small heat capacity. Replacement of any part of the bath can be effected without draining the liquid.

Beaker Tongs

Since introducing their p.t.f.e. glass stopcock, the **Loughborough Glass Co. Ltd.**, Loughborough, Leics, have extended the range to include 3-way stopcocks. These stopcocks, designed and manufactured by the Watson-Marlow



Beaker tongs by Loughborough Glass

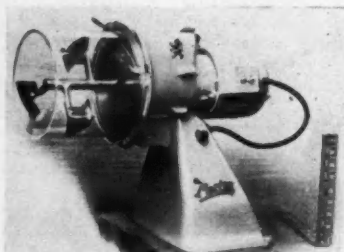
LABORATORY EQUIPMENT REVIEW

Airpump Co., and is obtainable only from the Loughborough company.

Also available are beaker tongs for handling hot and corrosive liquids in containers of 2 in. to 6 in. diameter. Die-cast in aluminium alloy, they can be held in one hand and have polythene jaw pads. Other products include polythene tube connectors, polythene beakers, bottle carrier, mercury collector, polythene carboys and an expanding range of equipment in polypropylene, notably beakers and measuring cylinders.

Lodge-Morton Mixer

The Lodge-Morton precision mixer, laboratory scale, is a precision mixer that, state the **Morton Machine Co. Ltd.**, Wishaw, Scotland, enables the most difficult mixes to be made with complete



Laboratory-scale mixer

homogeneity. It is particularly suitable for mixing dry powders and granulates, the addition either of trace elements or liquids when the end product is a dry powder or granules.

Instead of forcing the particles together, the Lodge-Morton mixer projects the particles into free space where they intermingle with other particles. For mixing in fats, liquids, oils, etc., to dry powders, special perforated plates are inserted to give a rubbing and grinding effect. A large range of mixers is available for both batch and continuous operation with working capacities from 0.5 gall. to 1,000 gall.

Neoprene Industrial Gloves

A wide range of neoprene gloves and gauntlets available from **Lewis Gilder and Co. Ltd.**, 44 Bedford Row, London W.C.1, covers light, medium and heavy types, lined and unlined, non-slip surface washgloves and general duty cotton-lined knitwrist gloves. They are suitable for use with oil, grease and solvents.

Direct-reading Oscilloscope

The new type 425 oscilloscope, manufactured by the **Allen B. du Mont Laboratories**, New Jersey, and available from the sole U.K. distributors, **Leland Instruments Limited**, Abbey House, Victoria Street, London S.W.1, incorporates the first direct digital reading system in an oscilloscope.

The type 425 is a high frequency instrument for use from DC to 60 megacycles, designed round a new Du Mont tube which operates with 12,000 volts

acceleration potential giving an extremely high sensitivity, high light output and high resolution on its 10 cm by 5 cm display area.

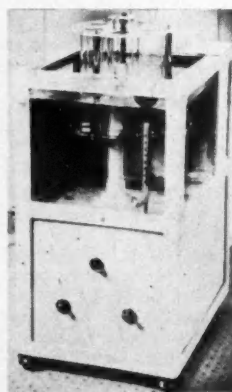
The instrument is built on the modular constructional system and a variety of plug-in modular units are available which enable the range and performance of the oscilloscope to be varied and extended in a number of ways.

The unique numerical read-out system ensures increased accuracy because the possible errors of interpolating and converting mathematically have been eliminated.

Tablet Disintegration Tester

A tablet disintegration tester has been designed by **Manesty Machines Ltd.**, Speke, Liverpool 24, to comply with the essential requirements of the British Pharmacopoeia for the disintegration test of tablets. The main frame is constructed of angle iron, all joints being welded, and the tank is integral with the frame. Base of the tank is sheet metal and the sides 18 oz. glass, all joints being sealed. A drain cock is fitted. Provision is also made for levelling. Heat is supplied by an immersion heater and temperature is controlled by a contact thermostat. A thermometer is fitted and the tank is illuminated from the rear.

The tablet cage is constructed from

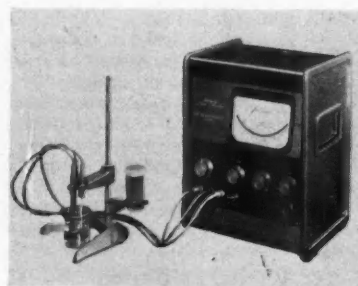


Manesty tablet tester

three discs of 3/16 in. thick transparent plastic, with chrome plated brass pillars and will accommodate six glass tubes. The tubes rest on discs of stainless steel mesh. The cage is readily adjustable for height and quickly removed for cleaning.

Laboratory pH Meter

A new laboratory pH meter, Type TF 1093, available from **Marconi Instruments Ltd.**, St. Albans, Herts, is mains-operated and intended for use in conjunction with a glass electrode system to give a direct indication of pH from 0 to 14. Any section of the scale can be expanded over a centre-zero incremental range of ± 1.4 pH, enabling small changes in pH to be measured



pH meter, type TF 1093

with a discrimination of better than 0.01 pH.

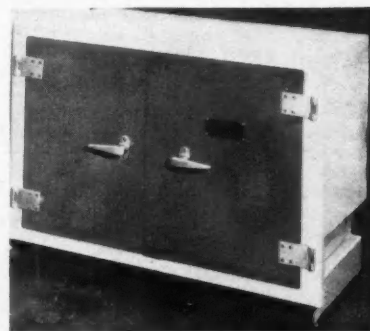
The main and incremental ranges are provided with independent buffer controls to enable accurate cross-correlation to be carried out. There is a ± 2 pH incremental switch for buffer solution extension or self-check. Full automatic compensation for solution temperature is provided on both ranges.

The instrument also measures voltages in the ranges 0 to 1,400 mV and ± 140 mV with the same high input impedance and stability as for pH measurement. This extends its use to such applications as rH or corrosion-potential measurements.

Laboratory Drying Cabinet

A new small laboratory drying cabinet is being manufactured by **L. A. Mitchell Ltd.**, 37 Peter Street, Manchester 2. This cabinet is designed for bench mounting and arranged to accommodate five standard trays 32 in. by 16 in. by 1½ in. deep, and can be supplied for either steam or electric heating. The cabinet consists of a double skin construction of sheet metal with efficient thermal insulation interposed between the metal sheets. The cabinets can be provided with a pressure plenum chamber to give forced convection conditions as required.

The air flow, when operating on natural convection or forced convection,



L. A. Mitchell drying cabinet

follows a serpentine path. In both steam and electrically heated units, non-indicating type thermostats can be provided with vapour pressure thermometers built into the door for measurement of operating temperatures.

Fire Extinguisher

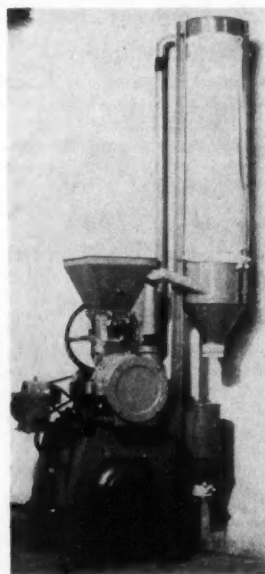
The new, small CO₂-type fire extinguisher produced by **Nu-Swift Ltd.**,

Elland, Yorkshire, is claimed to be suitable for indoor fires involving small quantities of inflammable liquids and electrical equipment, including locations where fine chemicals, industrial solvents, etc., are stored or handled.

The Model 1505 extinguisher contains 5 lb. of carbon dioxide and is of the upright type, being operated by pulling out the safety clip and striking the knob. The operational range in still air is 11 ft., and the discharge lasts 8 sec. It is stated that the discharge will extinguish inflammable liquid fires over an area of 6 sq. ft. if the firefighter is inexperienced and of 9 sq. ft. if he is experienced.

Hosokawa MoN Mill

With the Hosokawa MoN mill, designed for laboratory and small-scale production and available from the sole U.K. agents, **Northgate Traders (City) Ltd.**, 36-38 Cophall Avenue, London E.C.2, particle size is controllable from



Hosokawa laboratory mill

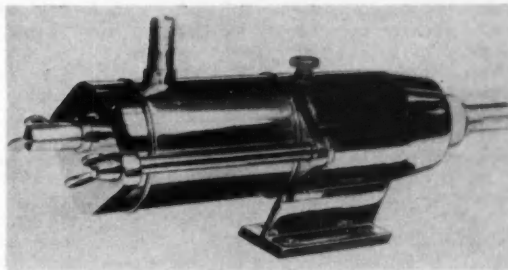
a low mesh to a few microns. A unique exhaust nozzle enables desirable or undesirable substances to be separated from heterogeneous materials.

Performance with minerals, such as talc, graphite, mica, etc., is said to be from 5 to 25 kg/hr., and with chemicals, such as pigments, synthetic resins, activated carbon, etc., from 5 to 15 kg/hr. The mill is available in various materials, including stainless steel.

Hygienic Laboratory Pump

The Ormond/Mono pump is now offered for laboratory or pilot-plant applications where meticulous hygiene is necessary. It was originally developed for the medical profession to be used on heart/lung apparatus, which called for a pump which would handle blood without damage to red blood corpuscles, combined with simplicity of

Ormond/Mono pump



sterilisation and suitability for clinical practice. **Mono Pumps Ltd.**, Mono House, Sekforde Street, Clerkenwell Green, London, E.C.1, therefore produced a special pump with an output up to 5,000 ml./min. which could easily be broken down for cleaning without tools and subsequently be autoclaved in one piece as a complete pump. The pump is produced in polished stainless steel with a resilient stator moulded from a special compound.

Heavy-duty Balance

Particularly suitable for applications employing large vessels, and where a high degree of accuracy is required at heavy loads, the model A04 chemical balance recently introduced by **L. Oertling Ltd.**, Cray Valley Works, St. Mary Cray, Orpington, Kent, has a capacity of 3 kg. in each pan and has a weighing height of 14½ in. The pans of the chromium-plated, flat, circular type, are 5½ in. in diameter.

Overall dimensions are: width, 20½ in.; height, 28½ in.; depth, 15½ in. The overall headroom required is 44½ in. with the front slide raised. The balance is adjusted so that 2 mg. swings the pointer by one division.

Testmatic Balances

The new Testmatic range of balances, made by Mikrowa High Speed Balance Works Ltd., Switzerland, and available from **Optical Mechanical (Instruments) Ltd.**, 17 Station Road, Egham, are one-pan balances that need no weights. Fitted with the large Mikrowa optical projection scales, they are intended for rapid routine weighing.

Unlike the larger capacity Mikrowa one-pan balances, their range is restricted according to the sensitivity required. Type T-100, for instance, has a direct optical reading range of 0-100 g. a scale division of 100 mg. with reading accuracy with vernier of 10 mg. Weighing time for this model is between 2 and 3 seconds.

Spectrometry and Gas Chromatography

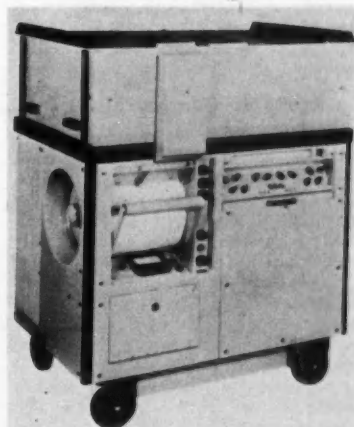
Ultraviolet and visible spectra from 190-750mμ are covered by the 137U spectrophotometer, which produces high-quality spectra automatically and rapidly. The ultraviolet and visible regions are covered successively in 2 min. for each

region. For special applications, a slow scan of 8 min. is also provided. Makers are **Perkin-Elmer Ltd.**, Beaconsfield Bucks.

The same company has developed a spectrometer using a permanent magnet with a field strength of about 9,400 Gauss. This instrument provides high resolution spectra which are sufficiently reproducible to allow spectra obtained at different times to be compared immediately.

The Perkin-Elmer vapour fractometer model 116 is now available with four interchangeable detectors, viz., thermistor and hot wire thermal conductivity detectors, β-ionisation detector and flame ionisation detector.

Spectrophotometer



Infra-red spectrophotometer made by Pye Ltd., Cambridge

Pye G.L.C. Integrator

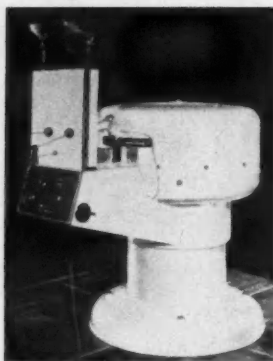
Designed for the automatic measurement of peak areas, for use with the Pye argon chromatograph, a new electronic feedback integrator is claimed to be equally suitable for use with many other British and U.S. gas chromatography systems. It is claimed to be highly accurate, has no moving parts and possesses no inertia. Standard components are used and electrical output is provided so that the integrated results can be displayed in many ways with conventional equipment such as potentiometric re-

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corders, moving-coil recorders, digitisers, oscilloscopes or even simple indicating meters.

Also available from **W. G. Pye Ltd.**, Granta Works, Cambridge, is an automatic titrator controller of new design which features two independent electronic relay circuits, each of which can be set up to operate at any point in the 1 milliamp input current range (e.g. 0-10 pH). The Pye instrument range is described in the new catalogue 'N'.

Handling Radioactive Tracers



Pantasafe, for the automatic handling and storage of radioactive tracers, is claimed to eliminate the hazards involved in manual handling. It is designed and manufactured by **Panatron Ltd.**, 5a Prince's Street, Hanover Square, London W.1

Portable Demineraliser

The latest, Mark 6, portable Deminrolit water demineraliser by the **Permutit Co. Ltd.**, Gunnesbury Avenue, London W.4, is a mixed bed ion exchanger capable of producing up to 12 gall./hr. of very pure water having a conductivity of less than 1.0 microhms. The Mark 6 is easy to install and operate, connection being made by flexible plastics pipes. Running costs are claimed to be very low and a conductivity tester continuously monitors treated water quality. The unit is free standing and equally suitable for use in the workshop as well as the laboratory.

The ion-exchange materials are **Permutit's** Zeo-Karb and De-Acidite. **Stand 22.**

New Fume Cupboard

In addition to their range of polythene apparatus, p.v.c. and polythene pumps, etc., **Rediwell Ltd.**, Crawley, will show at the exhibition their newly designed fume cupboard. Mounted on a timber base unit, it will be constructed mainly from rigid p.v.c. and will have Perspex windows.

Another addition to the Rediwell range to be shown for the first time is a small dispensing unit. This can be attached to an aspirator bottle and is made to deliver liquid by applying pres-

sure on a small lever extending near the nozzle. **Stand 58.**

X-Y Recorder

One of the recent developments available from **Scientific Furnishings Ltd.**, Poynton, Chesh., is model HR-92 X-Y recorder. A null-seeking servo-type plotter designed to draw curves in Cartesian co-ordinates on regular 8½ in. by 11 in. paper, it employs conventional chopper amplifiers and potentiometer re-balance. Reference voltages are furnished by mercury cells. The paper is easily slipped under the retaining rails and can be removed with no readable mis-alignment.

Shandon's New Exhibits

A range of new products will be shown by **Shandon Scientific Co. Ltd.**, 6 Cromwell Place, London S.W.7, including those from **Fisher Scientific Co.**, U.S., for whom Shandon are now authorised U.K. distributors. Fisher apparatus includes the first commercial application of gas chromatography to the rapid analysis of clinical gases; model 25 battery-operated portable gas chromatograph which will run the equivalent of an Orsat analysis in 10 minutes; Duo-Spectral spectroscopy for rapid qualitative and semi-quantitative analyses of elements; chemical zone refiner which will automatically purify most organic and inorganic chemicals that melt between 50°C and 300°C.

From **Metrohm**, Switzerland, will be the Potentiograph, a new automatic recorder for all potentiometric, pH, Redox, precipitation and other complex titrations. The new Cahn electrobalance is portable and will weigh to an accuracy of 1 microgram.

Shandon will show their latest gas chromatography apparatus which offers a choice of three interchangeable detectors. Other new equipment includes the B-D Cornwall continuous pipetting outfit for the fast automatic transfer of accurately measured repeat doses; the Filamatic automatic vial filler; Jumo-Shandon contact thermometers; and the Warning Blender capable of rapid blending of quantities up to 1 gall. **Stand 33.**

Dewpoint Measurement

About half scale on the new dial introduced by **Shaw Moisture Meters**, Rawson Road, Bradford, is said to represent the practical limit of previous measurements of dewpoint. The other half (-70°C to -120°C) are expected to find applications in industries as the latest air and gas dryers using molecular sieves now dry down to -107°C. The dial is fitted to the latest Shaw hygrometer and this, with the more dry gas now available, will, it is thought, make possible new processes.

Versatile Lab. Mixer

In response to increasing demand, particularly from present users of their range of high speed mixer emulsifiers, **Silverson Machines (Sales) Ltd.**, 55/57 Tower Bridge Road, London S.E.1, have intro-

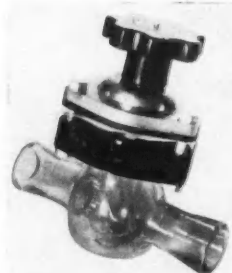
duced a smaller laboratory model. A facsimile, on a laboratory scale, of the larger machines and all their present modifications, the Silverson high speed laboratory mixer has a capacity of from 8 fl. oz. to 2 gall., according to viscosity, at variable speeds up to 8,000 r.p.m.

Normal mixing and emulsification are carried out by the standard head and mesh, as is also the fine suspension of insoluble solids. The axial flow head has a similar effect with an action modified for use in deep containers and it is of particular value where the complete absence of aeration is essential. The cutting or disintegrator head will rapidly reduce solid gums and resins to a mucilage (e.g. methyl cellulose in two minutes).

With a full range of attachments, the mixer can, it is said, handle any task of mixing, emulsifying, suspending, homogenising, pulping, disintegrating and pumping likely to be met in the laboratory. The price, inclusive of all attachments and an adjustable bench stand, is £31 10s. All working parts are constructed of stainless steel. **Stand 45.**

New Glass Stopcock

A new glass stopcock for laboratory use, introduced by **G. Springham and Co. Ltd.**, Harlow, Essex, is a greaseless, high vacuum stopcock using a monomer



Greaseless valve by Springham

rubber diaphragm for its control. Although primarily a vacuum valve, the stability of the rubber enables the successful control of many liquid phase operations. The company also now manufacture a larger edition of its greaseless valve to fit 1 in. pipeline. Easily cleaned, it requires no grease, is non-corrosive and finite in operation.

Inquiries prompted the firm to make stopcocks and apparatus incorporating stopcocks with interchangeable keys, under the name Interkey. The glass key can be purchased separately. A further development is a solid p.t.f.e. key, which is also interchangeable within the range. These keys are greaseless, inert for most needs and 'non-freezing.' **Stand 53.**

Micro-vapour Pressure Apparatus

New from **Stanhope-Seta Ltd.**, Park Close, Englefield Green, Surrey, are the Seta 2317 micro-vapour pressure apparatus, Seta 1525 colour comparator and Seta 2345 sliding plate microviscometer. The micro-vapour pressure (Mottlau) apparatus, manufactured under licence from Esso Research and Engineering, is

said to enable greater accuracy than the Reid method and completion of tests in about a quarter of the time. A sample charge of 1 ml is introduced from a pipette through a mercury sealed orifice. Changes in pressure within the bulb are measured by a modified U-tube manometer fitted with a mercury pump leveling device.

The Seta-Lovibond colour comparator has been developed for determining the colour of petroleum products, such as lubricating oils, heating oils, diesel fuel oils and petroleum waxes. The sliding plate microviscometer was designed by Shell Development Co. for determining the viscosity of asphaltic types of materials over a range of 10^2 to 10^{10} poise.

Unicum Mill

The Sturtevant Unicum mill has been designed for laboratories wishing to reduce materials to a very fine state. A self-contained unit, it is complete with a separating system operating in a closed circuit that is under suction, thus preventing any dust leakage. It will reduce almost any soft or medium-hard material to a micron size without using external energy such as steam or compressed air, or the need for screens at any stage of the operation.

The air separator system allows exact regulation to a predetermined size of the finished product. If required, the coarse product can be delivered externally from the separator instead of returning to the mill so that two products of different particle size are obtained at the same time.

Other laboratory machinery, described in publication No. 9606, available from **Sturtevant Engineering Co. Ltd.**, Southern House, Cannon Street, London E.C.4, includes crushing and grinding equipment, screening and separating machinery, a batch blender, a sample divider, sample cutter, Vezin sampler and sample splitter.

Corrosion-resistant Fittings

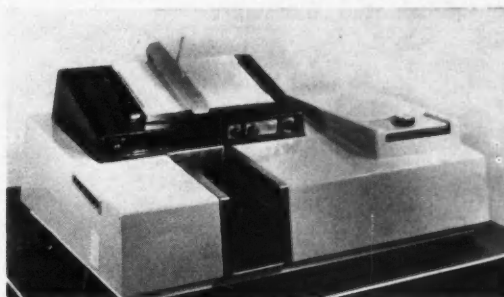
Laboratory work recently carried out by **Tanks and Linings Ltd.**, Town Wharf, Droitwich, Worcs, includes benches of timer construction with all working surfaces, including sinks and troughs lined with cream finished rigid p.v.c. The associated fume removal ducting is also in rigid p.v.c. The benches, fitted for Ferranti Ltd., Manchester, give complete protection against the corrosive action of hydrofluoric acid used in the etching of glass parts. Perspex covers, which are removable, allow unrestricted visibility, while protecting the laboratory staff. Such fabrications are tailor-made to suit customers' requirements.

Desiccator Cabinets

The desiccator cabinet manufactured by **Townson and Mercer Ltd.**, Beddington Lane, Croydon, has been redesigned with a glass-fibre body and new features. An unframed plate glass door is still used, but the hinges have been redesigned, and a cam action closure gives greater ease of operation with the same positive seal against a tubular rubber gasket. Four removable plate glass shelves are provided.

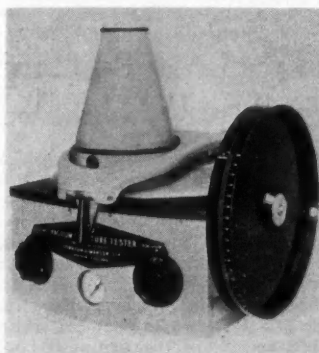
LABORATORY EQUIPMENT REVIEW

Unicam Mark II spectrophotometer



Only one size (21 in. by 16 in. by 11 in.) is now made and this can be fitted with a circulating fan if required. This fan, situated at the bottom rear of the cabinet, draws air from above the tray of desiccant or humidifying agent and passes it by means of a small duct to the top of the cabinet; thus ensuring that uniform conditions are obtained throughout the interior. The fact that the air is constantly moving also greatly increases the speed of stabili-

The instrument employs a high resolution prism/grating double monochromator; the prism and the two diffraction gratings are mounted on separate turntables and provision is made for mounting up to three different prisms (NaCl , KBr , or SiO_2) on the same turntable. Push button operation enables rapid interchange of prisms, gratings or cams. A variety of cells is available, including fixed path liquid cells, microcells, variable pathlength cells, gas cells, KBr disc holders and Nujol null holders. The spectrophotometer is designed for operation under vacuum and a rotary pump.



Vacuum moisture tester which permits the estimation of moisture in many organic materials, with an accuracy of $\pm 0.1\%$, in times varying from two minutes up to 12 minutes, depending on content and organic structure. By adapting the process, total solids in rubber latex and similar liquids can be tested

lisation when samples are inserted which will either lose or take up moisture.

Also available are a vacuum moisture tester for a range of organic materials, with an accuracy of $\pm 0.1\%$; and the X27 major thermostat bath.

Unicam Mk. II Spectrophotometer

The newly developed Mark II SP 100 infra-red spectrophotometer of **Unicam Instruments Ltd.**, Arbury Works, Cambridge, costs under £1,400. It is stated that in the hands of organic chemists it will play an important role in any programme involving chemical analysis. For routine work, simplicity of operation and special design features make possible the delegation of time-consuming work to general laboratory staff. Only one operating control is used when the instrument is set up.

Voss Magnetic Stirrer

In the field of magnetic stirrers **Voss Instruments Ltd.**, Faraday Works, Maldon, Essex, have brought out several models over the years. The latest is type S/MAG/30 suitable for stirring quantities up to 30 l. It measures 12½ in. by 9½ in. by 9 in., weighs 12 lb. and is silver-hammer finished. Normally it is supplied with a 1½ in. Teflon rotor. It can be used with heating mantles and will stir



Magnetic stirrer

as far as 6 in. above the case, and is available for either a.c. or d.c. supply.

Laboratory Glassware

A large range of laboratory glassware, including glass to metal seals for use in electronic equipment and apparatus for lead-through seals, is produced by **Wesley Coe (Cambridge) Ltd.**, Scotland Road, Cambridge. The range includes

mould blown bulbs and vacuum quartz apparatus; the firm also handles repairs to apparatus.

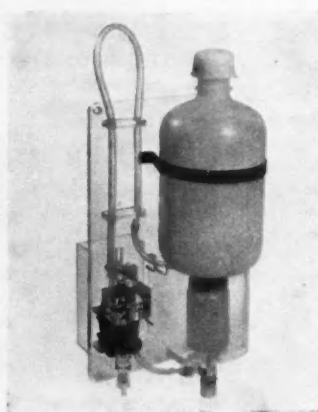
Graduated Glassware

The range of graduated glassware available from **A. D. Wood**, 4-5 Skinner Street, London E.C.1, has been increased and the JayTec range, which has been added, is said to have the benefit of more competitive prices. A new scaffold foot has been introduced and is available threaded to take standard retort rods.

A. D. Wood are now holding stocks of both E-Mil and Pyrex laboratory glassware. The firm's glass capillary spiral for gas liquid chromatography is now being supplied mounted on a metal frame to facilitate handling and connection. A new price list is available, superseding three separate lists and a separate catalogue of plastics laboratory-ware has been produced. **Stand 10.**

Liquid Dispenser

Two I.C.I. plastics, Perspex and Alkathene, have been used in the manufacture of the Condesco drip regulator, a precision-made instrument for dispensing all types of liquid in droplet form,



Condesco drip regulator

marketed by **Lyne, Frank and Wagstaff Ltd.**, of London Road, Enfield, Middlesex, who are the sole manufacturers. The regulator is specially suitable for the introduction of detergents into bottle and churn washing plant, but can be used for all types of liquid, either acid or alkali.

Zone Refining Method Produces Benzoic Acid P.V.S. for H. and W.

BENZOIC acid P.V.S. (purified for volumetric standardisation), available in a purity of more than 99.9%, from **Hopkin and Williams Ltd.**, Chadwell Heath, Essex, has been recommended as an alkalimetric standard in volumetric analysis and is also widely used as a standard substance in calorimetry. For both purposes, purification by fractional freezing has been described.

The development of zone refining techniques, however, has made it possible to apply the principle of fractional freezing in a new and effective way. Benzoic acid P.V.S. is produced by applying zone purification (with the B.T.L. zone melting apparatus, N.C.L. pattern, macro model) to benzoic acid 'Analar' which is more than 99.9% pure. The resulting product, it is stated, may be accepted as of 100.00% purity.

The passage of six molten zones through the column of starting material concentrates the impurities at one end, leaving a column of completely homogeneous purified material. In practice eight zones are passed through the column, the impure section is rejected and the remainder is melted out, powdered in a glass mortar and transferred to dust-proof bottles, under close supervision in the H. and W. research and development laboratories.

Further information on benzoic acid P.V.S. is given in the new edition of 'P.V.S. reagents, purified for volumetric standardisation,' available from Hopkins and Williams. The zone melting apparatus is described in the *B.T.L. Bulletin*, May issue.

Other P.V.S. reagents are potassium bicarbonate, potassium dichromate,

potassium iodate and sodium chloride. Unlike benzoic acid, these are produced by recrystallisation.

New reagents for iron and copper, obtainable from Hopkin and Williams, are:— 4:7-diphenyl-1:10-phenanthroline (Bathophenanthroline); and 2:9-dimethyl-1:10-phenanthroline (Neocuproin). Substituted 1:10 phenanthrolines are said to show a remarkable variation in chelating properties, depending on the nature and position of the substituents. The 4:7-diphenyl compound is a highly selective reagent for ferrous ions, with which it forms a soluble deep red complex, permitting the detection of 1 part of iron in 10^4 parts of solution. The 2:9-dimethyl compound forms a soluble organo complex with cuprous ions, but gives no colour with ferrous ions. Copper can be detected at a concentration of 1 part in 10^5 parts of solution.

Ministry Sets Up Infestation Control Advisory Committee

A committee has been appointed by the Ministry of Agriculture to advise and report annually on the programme of experimental and research work of the Infestation Control Laboratory of the Ministry. This is noted in the current issue of the Ministry's journal *Agriculture*, which also reveals that Prof. J. B. Cragg, B.Sc., M.Sc., Professor of Zoology in the University of Durham, has been appointed chairman.

The Infestation Control Laboratory is part of the Advisory Service and is situated at Tolworth, near Surbiton.

First Laboratory Show Opens Next Week

THE first Laboratory Apparatus and Materials Exhibition will be held at the Royal Horticultural Society's New Hall, London S.W.1, from 20 to 23 June. Some of the new and improved items of apparatus and equipment due to be exhibited are described in our special review of laboratory apparatus in pages 1019 to 1028.

A complete programme of lectures being held in conjunction with the exhibition is given below.

20 June: 'The labelled pool technique in biology', F. P. W. Winteringham, F.R.I.C.; 'Indicators', Prof. R. Belcher, D.Sc., Ph.D., F.R.I.C.; 'Ion exchange techniques', J. E. Salmon, Ph.D., B.Sc., F.R.I.C. 21 June: 'Polarography in the food and beverage industries', J. Hetman, F.R.I.C.; 'Glass as a laboratory material', Prof. R. W. Douglas, D.Sc., F.Inst.P.; 'Rheology', G. W. Scott-Blair, M.A., D.Sc., Ph.D., F.Inst.P., F.R.I.C. 22 June: 'Microscopy. Devices and techniques in biology and other sciences', A. E. Saunders-Singer; 'Small scale manipulation', M. A. Fill, F.R.I.C.; 'Gas chromatography', A. T. James, Ph.D. 23 June: 'Laboratory computers', A. D. Booth, D.Sc.; 'Clinical biochemistry', Prof. E. J. King, D.Sc., Ph.D., F.R.I.C.; 'Safety techniques in the microbiological laboratory', Surg. Cdr. H. M. Darlow, R.N.(ret.), B.A., M.R.C.S., L.R.C.P.

"Structure and Reactivity in Hypersensitive Agents"

A joint half-day symposium is being arranged by the Manchester section and the fine chemicals group of the Society of Chemical Industry, and the Manchester and district section of the Royal Institute of Chemistry, on the subject of structure and reactivity in hypersensitive agents.

The symposium will be held at Alderley Park on Friday, 30 September, starting at 2 p.m. and it is expected that three to four papers will be delivered, followed by a tour of the laboratories at I.C.I.'s Pharmaceuticals Division.

Large Attendance at Instruments Sales Conference

Agents' representatives from as far afield as Australia, Canada and India, as well as from most western European countries, attended the Cambridge Instrument Co.'s 36th annual sales conference, in addition to home-based representatives of firms operating in China, India, Egypt and south-east Asia, and those selling in some eastern European countries. It was the largest gathering of overseas representatives yet to attend the company's conference, reflecting the emphasis this year on the need to increase overseas sales in the face of greater competition.

Extensions to B.S.I.R.A.

Work has started on the erection of a new building at the British Scientific Instrument Research Association, Chiselhurst. The building, which will comprise new workshops and mechanical laboratories, should be completed by late autumn. The extensions will enable the association to extend its activities in the mechanical engineering field; provision has been made in the workshops to accommodate more specialised equipment.

Recent Developments in Interchangeable Laboratory Glassware

AT the Stone, Staffs, glassware factory of Quickfit and Quartz Ltd., a new layout and production system has recently been completed, giving an improvement in output of up to 30% over previous methods. Many of the manufacturing processes, formerly regarded as the realm of hand craftsmen, have been converted to semi-automatic production by the application of modern techniques and equipment.

These techniques have enabled the company to market a comprehensive range of glassware suitable for small-scale batch production of pharmaceutical and other fine chemicals. The range is based on apparatus of 10- and 20-litre capacity fitted with flat flange connections of 100mm. nominal bore. The flasks are connected to lids carrying a number of socket connectors which enable the flask to be fitted with thermometer pockets, gas inlet tubes, sampling tubes, dropping funnels, stillheads and stirrers. The range of equipment for this scale of operations also includes condensers of 0.2 m² surface area.

Vacuum receiver systems are made from several interchangeable parts so that when this equipment is used by relatively unskilled personnel for production purposes, any damage caused by breakage is localised and replacement is a quick and simple matter.

Advantage of Speed

Glass apparatus up to 20-l. size fitted with conical and flat flange ground glass joints has important advantages. Most important is the speed with which any desired equipment can be assembled and taken down again, and the versatility of the comparatively small range of standard parts which will carry out the principle processes of preparative chemistry: reflux, reflux with addition and reactants, steam distillation, distillation under normal and reduced pressure, and fractionation.

An important consideration is that this equipment can be supported by the normal laboratory stands and bosses. Although it is better to use one of the several commercially available systems of laboratory scaffolding, together with laboratory clamps and boss heads, no special structures are required. The wide neck of the flasks, with the simple stainless steel clip for holding the flask and its adapter together, make manual cleaning of the flasks a very easy matter.

The range is completed by a recently introduced soxhlet-type liquid/solid extractor of a nominal capacity of 2 l. and fitted with 100 mm. flat flange to enable

Typical Q. and Q. assemblages in use at an educational establishment. Apparatus shown is from the basic set of five parts



quite large samples of material to be handled.

Quickfit and Quartz have pioneered the idea of sets of apparatus, chosen to give the maximum versatility from the minimum number of parts selected, and using usually only one or possibly two sizes of joints. The largest assemblage is a comprehensive set of apparatus consisting of 97 parts, considered to be a complete set of equipment for one research or development chemist and is, therefore, ideal for the chemist who may be called on to tackle a wide variety of problems at short notice.

The assemblage idea has been developed extensively in the last year or so and there is now a set for every stage of preparative organic chemistry. Made from heat- and chemical-resistant borosilicate glass, these sets are provided with their own plastics storage trays, to avoid accidental breakage of the apparatus while stored. The boxes are designed to fit into the average laboratory bench drawer, and the size of the trays is standardised so that a number can be kept in a storage cabinet if desired.

Extension kits are available to convert one set to another throughout the range

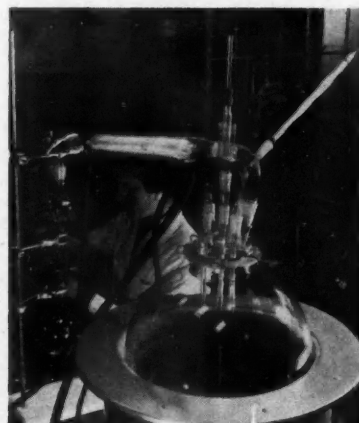
so that a chemist's basic glass equipment can be built up as his work proceeds. Contents of each assemblage ensures that it will cover the widest possible range of techniques, while keeping the number of different parts as low as possible. The large kits provide extra numbers of items which are in almost constant use, such as flasks and stoppers, enabling several pieces of apparatus to be operated at one time.

The idea of assemblages is particularly suitable to educational establishments. Quickfit provide a set of only five parts, all of exactly the same design and quality as those used by an advanced research worker, which will carry out on the 50 ml. scale all the preparations of a school course in organic chemistry normally required for advanced level G.C.E. This set can be extended to a comprehensive set of 21 parts with which all the normal techniques of chemistry required at undergraduate level can be accomplished.

Apparatus on a still smaller scale, i.e., up to 25 ml. nominal capacity, is also available. The smallest set of six parts provides a pear-shaped flask designed to reduce bumping to the minimum, and to allow liquids to be evaporated to small bulk easily; a stillhead and all-glass thermometer with ground joint, tap funnel, condenser and receiver adapter. These parts will carry out the main operations of preparative organic chemistry.

The complete assemblage on this scale consists of 21 parts and in this case the storage box is of dual purpose. It can be put together to form a stand which requires no other system of clamping to enable the equipment to be assembled and operated. The set includes stirring equipment of the turbine type which can be driven by compressed gas, water pressure, or the vacuum provided by a water pump, whichever is most suitable for the job in hand. Thus this assemblage or one of its component sets will carry out all the preparative chemistry on the gramme scale usually required for schools, colleges, universities or industrial research.

Instruction booklets are supplied with the assemblages detailing many practical points regarding the use of glass apparatus, in particular techniques of heating are described in detail.



This flask is connected to a lid carrying a number of socket connectors, enabling it to be fitted with thermometer pockets, gas inlet tubes, sampling tubes, dropping funnels, stillheads, stirrers and condensers of 0.2 m² surface area

W.R.A. STUDIES LENGTH OF LIFE OF POLYTHENE PIPES

PLASTICS pipes are often classed with earthenware, concrete and asbestos cement as 'non-metallic'. They share with these the resistance to corrosion, but the Water Research Association indicates (*Water Research News*, No. 8) that there are good grounds for placing plastics, or rather thermoplastics, in a third category since they possess the property of visco-elasticity. Under stress they exhibit a time-dependent elastic strain and it is this factor which is of great importance for it sets the limit to their life. Knowledge of the structure and behaviour of this structure, under stress, can assist in judging the life expectancy of a polythene pipe under its working conditions.

When a polythene pipe is subjected to water pressure the walls of the pipes are put under circumferential stress (approximately equal to the water pressure times the ratio of the tube radius to wall thickness). As a result of this tensile stress the pipe expands.

Causes of Failure. Several causes of this deformation are recognised. First, the material suffers an elastic or Hookean strain proportional to the stress. Secondly, the water pressure being continuous,

there is the viscous-elastic strain characteristic of thermoplastics. The magnitude of this strain can be several hundred times the Hookean strain. The explanation is that the crystalline parts of the polythene behave as elastic solids, but they undergo their deformation in a very highly viscous medium.

Thirdly, there is some true creep, which is, theoretically as well as practically, irrecoverable. This is generally due to the viscous flow of the amorphous material. Although small compared with the visco-elastic strain, under very high stress it may be presumed, it is stated, that the crystalline structure also undergoes permanent deformation and then the plastic strain is considerable and perhaps predominant.

As the pipe material deforms as a consequence of these stresses, the pipe increases in diameter, so that the wall thickness is reduced with the result that, if the water pressure remains constant, the tensile stress on the pipe walls is increased.

Different Kinds of Failure. Two different kinds of burst occur in a polythene pipe—ductile fracture and brittle frac-

ture. In the former, the pipe at some point suddenly distends and bursts. At a weak point the crystals have begun to break up, energy is released, the polythene softens and the fluid is blown into a bubble. Where the stress is insufficient to break up the crystals the material may fail by brittle fracture. This occurs under prolonged bi-axial or poly-axial stress. A tiny slit appears between crystalline and amorphous parts.

Correlation of long pipe life and other desirable mechanical properties with the molecular and crystalline constitution of the polythene could lead, it is stated, to the production of a material specially suited to the needs of the water industry.

The technology division of the Water Research Association is aiming to establish a method of pipe testing which will give in a short time a reliable indication of the lifetime under service conditions.

Potentiometric Method for Plutonium Determination

A SIMPLE method for the determination of plutonium potentiometrically in the range of from 1 to 10 mg. is described in the U.K. Atomic Energy Authority unclassified report, AERE-R 3264 (by A. J. Fudge, A. J. Woodard, M. F. Banham), obtainable from H.M. Stationery Office. The plutonium, in sulphate solution, is reduced to the trivalent state by the addition of excess chromous sulphate in IM sulphuric acid. The excess chromous sulphate is air oxidised until a steady potential is observed from the platinum/calomel electrodes. The plutonium-III is then oxidised to plutonium-IV with a standard solution of ceric sulphate.

A procedure is also described for the separation of plutonium from elements that would cause interference with the titration.

A.E.R.E.-R.320 1, 'A method for sealing lithium fluoride windows to Pyrex vacuum systems,' by P. C. Wildy.

Obituaries

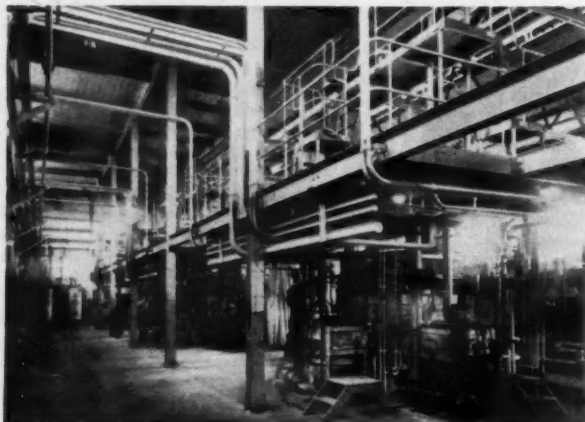
Mr. W. E. Cone, O.B.E., late technical adviser of the British Road Tar Association, died on 7 June. He was appointed technical adviser in 1925 to the Joint Road Tar Committee representing the gas, coke oven and tar distilling interests, which was the forerunner of the British Road Tar Association formed in 1926. He then became technical adviser of the B.R.T.A. until his retirement on 14 March 1958.

Dr. Francis Noel Kitchen, chemist with I.C.I., died at his home in Widnes on 6 June. Dr. Kitchen was educated at Caldy Grange and Liverpool University, where he gained his Ph.D. He began his career with I.C.I. at the Central Laboratory, Widnes. Later he became chief chemist at the Pilkington-Sullivan Works, and was promoted to deputy works manager. For some time afterwards he was among those who pioneered plant research work at the Gaskell Marsh Works. Subsequently he was transferred to Liverpool to work with the operations department of the General Chemicals Division. He had been with the Liverpool staff for the past 15 years.



Mullard's Continuous Glass-making Plant

VIRTUALLY a factory on its own is the continuous glass-making unit at the Blackburn plant of Mullards Ltd. Most of the glass produced, which is a clear, faultless lead glass, is absorbed by the factory's valve-making units. A significant proportion, however, is worked into envelopes for the millions of semiconductor devices made annually in the company's southern production units and into necks for the television tubes. (See also *CHEMICAL AGE*, 5 March, p. 399.)



Cutting and forming the glass tubes into valve envelopes, above left

General view of the glass-making furnaces. The tubing is drawn vertically upwards through roof of the shop

● **Mr. A. C. Copisarow**, at present Scientific Attaché at Paris, is to be the new director of the D.S.I.R. Forest Products Research Laboratory, and not **Mr. H. Wooldridge, O.B.E.**, as previously announced. Mr. Wooldridge was requested to withdraw his acceptance of the directorship because of increasing pressure of work at D.S.I.R. headquarters, where he will continue to hold the post of deputy director, Stations division. Mr. Copisarow will take up his post at the F.P.R.L. in October when **Dr. F. Y. Henderson, C.B.E.**, the present director, retires. Mr. Copisarow, who graduated in the Honours School of Geology, Manchester University, in 1942, was from 1946 to 1954 with the Joint Intelligence Bureau, Ministry of Defence, publishing also a series of fundamental papers in colloidal chemistry.

● **Mr. F. A. Lyne, B.Sc., F.R.I.C.**, hon. secretary of the Association of Public Analysts, has joined the consulting practice of **Mr. J. A. Radley, M.Sc., F.R.I.C., F.S.D.C.**, as head of the Analytical Section, but has retained his appointments as Public Analyst and Official Agricultural Analyst. His new address is Radley Industrial Research and Development Laboratories, 220 Elgar Road, Reading.

● Following the acquisition of Godfrey Whitehead and Son Ltd., by Bush Beach and Segner Bayley Ltd., **Mr. W. D. Crossley** and **Mr. G. Banforth** will continue as executive directors of the former company. **Mr. D. A. Gates**, chairman of Bush Beach and Segner Bayley, has joined the board and has been appointed chairman.

● **Dr. J. J. P. Staudinger, Dr. Ing.**, technical director of the Distillers Plastics Group, has been elected a Fellow of the Plastics Institute. Other fellowships include those awarded to **Dr. W. Blakey**, joint managing director British Industrial Plastics Ltd. and managing director of B.I.P. Chemicals Ltd., **Mr. M. Jones**, a director of I.C.I. Plastics Division; and **Mr. A. E. Skan**, managing director, Tufnol Ltd.

● **Sir Charles Dodds, M.V.O., F.R.S., D.Sc., Ph.D., M.D., F.R.C.P., F.R.I.C., F.R.S.E.**, has been appointed chairman of the inter-departmental Advisory Committee on Poisonous Substances used in Agriculture and Food Storage. Sir Charles, who succeeds **Sir Solly Zuckerman**, is Courtauld Professor of Biochemistry at London University. He has served since 1951 as the chairman of the Preservatives Sub-Committee of the Food Standards Committee. The Poisonous Substances Committee was recently reconstituted, as noted in CHEMICAL AGE, 4 June, p. 914.

● **Professor A. C. Frazer, M.D., D.Sc., F.R.C.P.**, Professor of Medical Biochemistry and Pharmacology, Birmingham University, was re-elected president of the British Food Manufacturing Indus-

PEOPLE in the news

tries Research Association at the recent annual meeting, and **Lieut.-Col. G. R. Harding, D.S.O., M.B.E.**, vice-president for the ensuing year. **Lord Tweedsmuir, O.B.E.**, was also elected a vice-president. Vacancies on the council created by the retirement of **Mr. Colin S. Dence, B.A.**, and **Mr. H. C. S. de Whalley, F.R.I.C., M.I.Chem.E., M.I.Biol.**, were filled by the election of **Major J. M. Oke (J. A. Sharwood and Co. Ltd.)** and **Dr. A. Carruthers (British Sugar Corporation Ltd.)**.

● **Mr. J. F. Perkins**, a member of the Pyrethrum Board of Kenya since 1956, has been elected vice-chairman. Mr. Perkins, who farms near Kitale, was formerly general manager of the Magadi Soda Co., Kenya, an I.C.I. subsidiary. He replaces **Mr. R. T. Mytton Watson** who resigned in March.

● Birmingham medal, 1960 of the Institution of Gas Engineers has been awarded to **Dr. D. T. A. Townend, C.B.E.**, director-general, B.C.U.R.A. Other medals and prizes have been awarded as follows: Gold medal, 1959, **Mr. E. Crowther, C.B.E.**, chairman Northern Gas Board, for a paper on underground pressure storage; Silver medal, 1959, **L. P. Ingram, M.B.E.**, and **Dr. M. J. F. Olden** for a paper on the use of primary flash distillate in conventional carbonising plant; Bronze medal, 1959, **J. R. Teale** for a paper on clearing the air; H. E. Jones medal, 1959, **G. S.**

Cribb and **J. D. F. Marsh** for a paper on removing CO from fuel gases; and William Dieterichs memorial prize, 1959, to **J. Ellis** for a paper on industrial gas in Birmingham.

● **Mr. Livio N. Borra** has been appointed a director of T. Giusti and Son Ltd., manufacturing stainless steel process plant. London-born Mr. Borra, who first joined Giusti 18 years ago, has been closely connected with the firm's expansion from food equipment into the much larger fields of the petroleum and chemical process industries. Works manager for several years, he now assumes the title of works director.

● **Mr. Hugh Southworth**, a director of the Woodall-Duckham Construction Co. Ltd. since 1954, and in charge of the high pressure process division, is the new president of the Institution of Gas Engineers. A member of the joint research consultative committee of the Gas Council and the Society of British Gas Industries, he was with Humphreys and Glasgow before joining Woodall-Duckham.

● **Mr. Richard Miles**, who retired as chairman and managing director of Head Wrightson on 31 January (see CHEMICAL AGE, 6 February, p. 247) was recently given a presentation, to mark his retirement, by the board, staff and work people at the head office in Thornaby. Mr. Miles joined the company in 1932. He was a director of the Nuclear Power Plant Co., the National Research Development Corporation, and a number of Head Wrightson subsidiaries.

● **Mr. S. A. Stewart, C.B.E., M.I.Struct. E., A.M.I.C.E.**, has been appointed director of the British Road Tar Association.

● **Professor R. L. Wain**, Professor of Agricultural Chemistry at Wye College, University of London, has been awarded the research medal for 1960 of the Royal Agricultural Society of England, in recognition of his work on plant growth-regulating substances and selective weed control through systemic fungicides and insecticides.

O.C.C.A. President Leaves for Australia

Bidding farewell at London Airport on 10 June to **Mr. P. J. Gay**, president, Oil and Colour Chemists' Association, and Mrs. Gay, on their visit to the Australian and New Zealand and O.C.C.A. sections, are left, Mrs. Hamblin and Mr. R. H. Hamblin, general secretary, and right, **Dr. J. E. Arnold**, hon. secretary



Commercial News

Ashe Chemical

Net trading profit of Ashe Chemical Ltd. for 1959 was £104,137 (£99,166). Tax took £43,635 (£39,098). A final dividend of 11%, making 16% (15%) is proposed.

Aspro-Nicholas

As well as meeting their dividend forecast of "not less than 34%", the directors of Aspro-Nicholas Ltd. are proposing to make a three-for-two scrip issue. The fourth interim is as promised at 12½%. The board anticipate that, subject to the continuance of the present favourable trading conditions, it would be their intention to declare dividends for the current year of not less than 14%, in the aggregate, which would be equivalent to 35% on the present ordinary capital.

Group trading profits, including £37,799 post-acquisition profits of the Griffiths Hughes group, were £1,000,036 (£712,138). After charging tax of £554,219 (£422,566) group net profits were £485,377 (£320,463.)

British Industrial Plastics

British Industrial Plastics Ltd., in a circular to shareholders on recent rumours of offers for a merger, have said that approaches have been made with a view to a merger by more than one substantial company. Negotiations are in progress, and should these come to fruition a further announcement will be made immediately.

Group turnover for the first seven months of the current year has increased by about 18% and profits before tax have increased by over 55%. The current level of trading is expected to continue for the rest of the financial year. In view of this, an interim dividend of 6% on the doubled capital (7½% on smaller capital) is declared.

Bush Beach Acquisition

Share capital of Godfrey Woodhead and Son, Ltd., chemical manufacturers, Slaithwaite, near Huddersfield, and their subsidiary, Bentham Chemicals Ltd., has been acquired by Bush, Beach and Segner Bayley Ltd., a subsidiary of Grovewood Securities, for a sum of £157,500. Bush Beach and Godfrey Woodhead have had working arrangements for many years (see also 'People in the News').

Griffin and George

Griffin and George Ltd., have purchased the share capital of R. and J. Beck Ltd., an old established firm of optical instrument manufacturers, whose products include microscopes. R. and J. Beck operate two works, at Watford and Kentish Town, have offices and a showroom at Mortimer Street, London W.1.

Griffin and George will retain the individuality of Beck's as a separate entity. Griffin and George have undertaken the continued employment and

● B.I.P. Say Merger Talks in Progress

● Bush, Beach Acquire Woodhead Capital

● Courtaulds Profit Up by £7.5 Million

● Lobitos Bid for Manchester Oil

future treatment of existing staff. The name of the business will be unchanged.

The present board, comprising C. J. Beck, S. Borthwick, G. E. Fowler and H. W. Morgan, will remain in office and be joined, in due course, by M. Lyth, H. C. Mayer, R. C. Palmer and F. A. Renn as additional directors representing Griffin and George.

Courtaulds

Group net profit of Courtaulds Ltd., excluding profits of Pinchin Johnson and Associates acquired last year, were £21 million (£13.5 million) for the year ended 31 March. Tax took £11.8 million (£7.2 million) and group net profit was £11.8 million (£7.2 million). A final dividend of 1s 6d per £1 ordinary unit, making 2s 6d, is declared on capital of £53.89 million (1s 11.2d on £53.5 million). A one-for-three scrip issue is also proposed.

Forestal Land

Group net profits for 1959 of the Forestal Land, Timber and Railways Co. totalled £715,049 (£592,052). Dividend is maintained at 9%. Sir Gerard d'Erlanger, chairman, says that 1960 profits will be seriously reduced by the severe price war in the vegetable tanning extract markets. The company's diversification programme is calling for a reallocation of resources involving an outlay of some £2 million. The field of animal feeding-stuffs has been entered through the purchase of V.W. Eves and Co., Hainault.

Manchester Oil Refinery

An offer of 20s for each 5s ordinary unit of Manchester Oil Refinery (Holdings) Ltd. or £1.62 million for the £405,000 ordinary capital, is to be made by Lobitos Oilfields. The boards of both companies have agreed that a merger would be in their mutual interests. Full details will be sent to M.O.R. stockholders as soon as possible.

Reichhold Chemicals

In view of the capital expenditure programme, the directors of Reichhold Chemicals Ltd. are to make forthwith a one-for-four rights issue on terms to be arranged. This was stated by Mr. W. H. Breuer, chairman, at the annual meeting on 14 June. Group profits in the first quarter of the current year exceeded those for the same period of 1959.

Permutit Co. Ltd.

Progress in the development of the electrolysis process of the Permutit Co. Ltd. had reached the point where the company had now decided to put one type of equipment into production and

hoped to follow it in the near future with a larger unit. This was stated by Mr. R. T. Pemberton, chairman, in his annual statement. Other developments included several new and improved types of ion exchange materials. In addition steps had been taken towards the production of other chemical products that "fall within the compass of our research and development facilities".

African Explosives

Group net profit of African Explosives and Chemical Industries for 1959 was £3.29 million (£2.39 million), after tax of £1.37 million (£1.46 million). Final dividend of 8½% making 12½% has been declared on increased capital (10%).

Hercules Powder Co.

Hercules Powder Co., Wilmington, Delaware, state that turnover for the first half of the current year is expected to be 11% above that for the same period of 1959; over the same period profit will have risen by from 5% to 6%. These estimates are below those made for the half-year in January, which anticipated a turnover increase of 15% and a profit rise of 10% for the half-year. Hercules add that a long-term programme for foreign expansion has been worked out, but do not give details.

Kalkstickstoffwerke

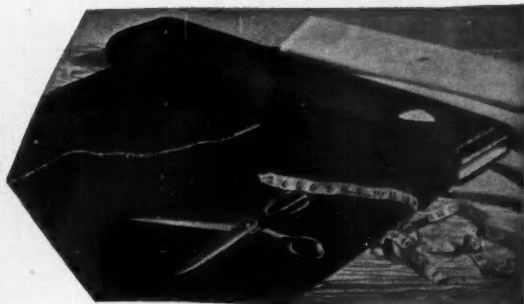
The German chemical producers, Suddeutsche Kalkstickstoffwerke AG, Trostberg, announce a turnover of DM191 million for 1959. Dividend of 10% (9%) is to be paid on a capital of DM32 million, of which 70% is owned by the State Vereinigte Industrie-Unternehmungen AG, of Berlin, and 30% by the holding company Verwaltungsgesellschaft für Chemiewerte mbH, Frankfurt-on-Main, a joint venture of B.A.S.F. and Hoechst.

Vick Chemical Co.

Vick Chemical Co., U.S., expect considerably higher turnovers for the year ended 30 June, than were recorded in the 1958-59 financial year and that these will rise further in the period 1 July 1960 to 30 June 1961. Capital expenditure for 1959-60 will have totalled between \$2.5 million and \$3 million and is expected to keep to the same level in the coming financial year.

INCREASE OF CAPITAL

UPSIL LTD., chemical products sales and distribution, etc., Marshgate Lane, Stratford, London E.15. Increased by £4,900, beyond the registered capital of £100.



PRICE'S FATTY ALCOHOLS

A length of cloth, a duplicating stencil, a lubricating oil and a lipstick don't, at first sight, seem to have any connection. And yet they all owe something to Price's Fatty Alcohols. Price's have developed a diverse and varied range of C16/C18 Fatty Alcohols to meet many specific needs. If you think you have a use for Fatty Alcohols please let us advise you.



PRICE'S (BROMBOROUGH) LIMITED

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TRADE NOTES

Laboratory Heating Catalogue

Copies of the new 52-page Electrothermal laboratory heating catalogue are now available from Electrothermal Engineering Ltd., 270 Neville Road, London E.7. Claimed to be the most comprehensive of its kind and to provide the largest range of laboratory apparatus, scientific instruments and surface heaters from one manufacturing source, it contains full technical information on the product range. The catalogue is fully illustrated and is complete with prices.

Change of Address

Head office of Rhodes Brydon and Youatt Ltd., makers of Mopumps, etc., has been moved to Reddish Engineering Works, Stockport, Ches. (Heaton Moor 6211.)

Venesta Packaging Service

One of the results so far announced as a result of recent changes at Venesta Ltd., Vintry House, Queen Street Place, London E.C.4, is the establishment of a nation-wide packaging service by the container department of the company, with centres at Erith in Kent, Birmingham, Manchester and Glasgow.

ALCOA Tabular Alumina

The Hydronyl Syndicate Ltd., 14 Gloucester Road, London S.W.7, have been entrusted by Imperial Aluminium Co. Ltd. with the sale of ALCOA tabular alumina products for the chemical, petroleum, petrochemical and allied industries.

'Clean Area' Clothing

A pamphlet describing ranges of special clothing for workers in 'clean areas' is obtainable from Practical Uniform Co. Ltd., Ora Works, Oldbridge Road, Balham Hill, London S.W.12.

New B.D.H. Chemicals

Four more chemicals have been added to the B.D.H. range. They are α - and β -amylase, phloretin and *o*-phthalaldehyde. Both amylases attack the α -1:4-linked glucose chains present in polysaccharides such as starch and glycogen. Among the characteristics of phloretin are its various colour reactions which are listed in the B.D.H. publication. The light-sensitive *o*-phthalaldehyde has, among other uses, found favour as a reagent for the detection and determination of certain amino acids.

New Adhesive

The new adhesive, Bondmaster G 523 series, of the Rubber and Asbestos Corporation, New Jersey, U.S., has been found to be most suitable for tank lining applications. Both the Hercules Powder Co., who have developed the new plastics Penton, and the Polymer Corporation, of Pennsylvania, makers of Penton tank linings, recommend Bondmaster G 523 series as the most suitable adhesive for tank lining applications, particularly for bonding Penton to metallic surfaces. Copies of technical data sheets, with

samples and prices can be obtained from the exclusive U.K. distributors Omni (London) Ltd., 35 Dover Street, London W.1.

Heavy-duty Degreasing Agent

A degreasing agent of the alkali type, Pyroclean No. 9, with uses in iron and steel cleaning, in automatic plants combining dip and spray, in orthodox spray cleaning machines and in the cleaning section of fully automatic metal pretreatment plants, is described in a sales bulletin obtainable from the Pyrene Co. Ltd., Metal Finishing Division, Great West Road, Brentford, Middlesex. Supplied in powder form, the material is used in aqueous solution operated normally within a temperature range of 190-205°F.

Dixie Carbon Black

Price of Dixie 45 GPF carbon black has been reduced by ¼d/lb. by the Anchor Chemical Co. Ltd., Manchester 11.

Appointed Burnok Agents

C. Tennant and Sons Ltd., 4 Copthall Avenue, London E.C.2, have been appointed U.K. sales agents for Burnok thixotropic alkyds by T. F. Washburn, Chicago.

Changes of Address

Following destruction of their London offices by fire, *The Chemical Trade Journal* now has its permanent head office at 19-21 Farringdon Street, London E.C.4 (Central 9181).

The new offices of Union Carbide International are located at 270 Park Avenue, New York 17, N.Y. U.S.

Market Reports

OXALIC ACID IN TIGHT SUPPLY

LONDON The industrial chemicals market has followed a steady course during the past week with buying interest fairly well spread over most sections. There has been some additional call for the routine soda products, while enquiry for potash chemicals and barium compounds has been reasonably good. Supplies of oxalic acid are reported to be tight. Export demand has been maintained at about the level of recent weeks.

The bases prices for some lead compounds have been reduced as from 9 June. Dry white lead is 55s per ton cheaper at £119 5s per ton, while red lead and litharge are each reduced by 75s/ton.

Business in coal tar products continues satisfactory, with quotations unchanged.

MANCHESTER Trading conditions have returned to their pre-holiday level in most sections and a fair number of fresh enquiries have been circulating

New address of Royce Electric Furnaces is: Albert Drive, Sheerwater, Woking, Surrey. Telephone: Woking 5401-4.

Curing Agent

Specially developed for use with Epikote 828 and Epikote 815 resins for the production of glass fibre-reinforced laminates, a new room-temperature curing agent, Epikure RTL, has been announced by Shell Chemical Co. Ltd., 170 Piccadilly, London W.1. Low viscosity, giving improved handling characteristics is one feature claimed.

Orifice Fittings

A number of standard orifice fittings, covering normal flow requirements for steam, air, gas or liquid measurement, are described and illustrated in a pamphlet issued by George Kent Ltd., Luton, Beds.

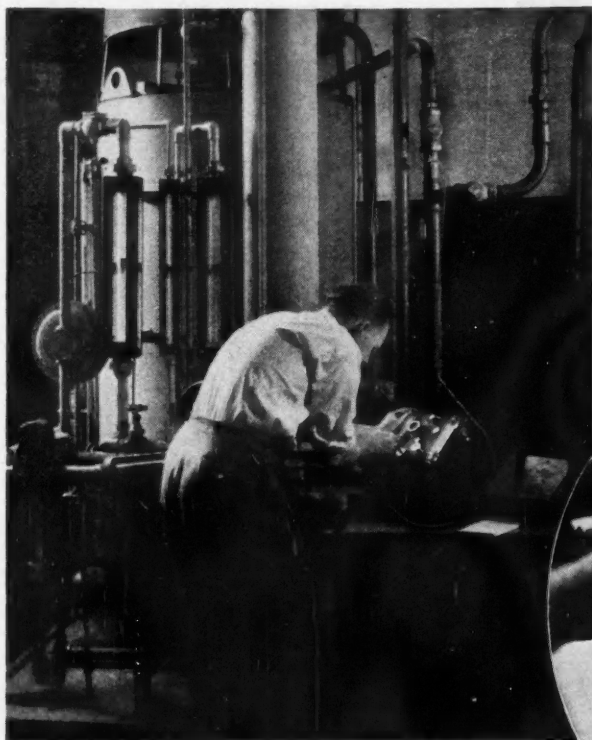
Do-it-yourself Electronics Kit by G. and G.

By combining the electronics skill of Clarke-Smith Manufacturing Co. Ltd. with the experience in educational scientific requirements of Griffin and George Ltd., Ealing Road, Alpertown, Middx, the first 'do it yourself' electronics constructional outfit has been produced to enable pupils to assemble for themselves a large number of experiments and demonstrations illustrating many of the fundamental principles of electronics.

The Griffin-Clarke-Smith Mechatronics apparatus makes little demand on the manual and technical skill of the user, since soldered joints are eliminated and the assemblies are screwed or clipped together on a pegboard layout.

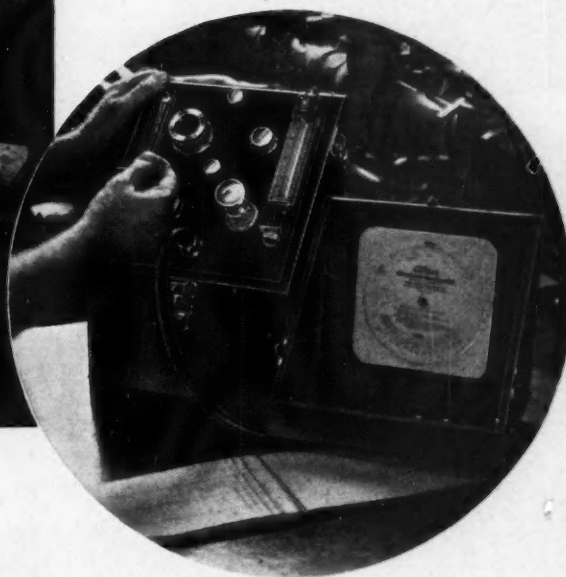
from home industrial users as well as from shippers, with deliveries against contracts on a satisfactory scale. Quotations generally continue on a steady basis, and little change of any consequence has occurred. From the point of view of fresh business the fertiliser market is more or less marking time in this 'between-seasons' period. In the tar products trade the demand for most light and heavy products is steady.

SCOTLAND Trading has again been well maintained in the Scottish market and has covered a wide range of industrial chemicals. Emphasis has been on immediate requirements, but some interest has been shown in forward deliveries. The position in regard to weed-killers is still one of activity and similarly the demand for agricultural chemicals is unchanged with a good volume of business for seasonal requirements. Prices have shown little change, mostly remaining firm.



The instrument in use on a 1,000 cu. ft. per hour endothermic atmosphere generator built by Electric Resistance Furnace Co. Ltd.

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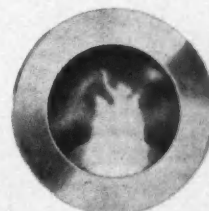


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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 13 July

- Method for the preparation of aminodithiothiazoles. Goodyear Tire & Rubber Co. **841 419**
 Bistriazinylamino-stilbene compounds. Farbenfabriken Bayer A.G. **841 189**
 Electrolytic process for making periodic acid solutions. Abbott Laboratories. **841 456**
 Preparation of carbon tetrafluoride. Du Pont De Nemours & Co., E. I. **841 457**
 Low-pressure polypropylene-silicone gum blends. Esso Research & Engineering Co. **841 070**
 Substituted carboxylic acid hydrazides and salts thereof and a process for the manufacture of same. Hoffmann-La Roche & Co. A.G., F. **840 877**
 Process for the production of bis-amidoximes. Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler. **840 878**
 Preparation of aliphatic branched-chain dienes having a halomethyl side chain as a branch thereof. Thiokol Chemical Corporation. **841 347**
 Steroid compounds. Laboratoires Francais De Chimiotherapie. **841 356**
 Method of stabilising trichloroethylene. Sicedison S.p.A. **841 107**
 Polymerisation of vinyl alkyl ethers. Goodyear Tire & Rubber Co. **841 236**
 Process for the preparation of allyl cyanide. Union Carbide Corporation. **841 468**
 Process for the manufacture of 4-amino-2,6-dichloro-pyrimidine. [Divided out of **841 231**.] Hoffmann-La Roche & Co. A.G. **841 239**

Open to public inspection 20 July

- Manufacture of uranium tetrachloride. Rosenfeld, S. **841 681**
 Ion sources. Wilson, R. R. **841 821**
 Manufacture of polymeric fatty acids. Wolf Ltd., V. Rowe, R., and Breakey, J. W. **841 554**
 Methods of extracting lithium from petalite, products of those methods and applications of those products. Morley, R. H. H. [trading as British Carbon & Chemical Co.] **841 989**
 Processes for the preparation of esters of acrylic and methacrylic acids. Wakefield & Co. Ltd., C. C. **841 521**
 Polymerisation catalysts and polymerisation reactions. Petrochemicals Ltd. **841 822**
 Indole derivatives. May & Baker Ltd. **841 524**
 Polymerisation process. Distillers Co. Ltd. **841 527**
 Organic isothiocyanates. Boots Pure Drug Co. Ltd. **841 824**
 Halogenation of polymeric hydrocarbons. Styrene Products Ltd. **841 946**
 Process and apparatus for separating paraffin wax from wax-containing hydrocarbon oils. Edleau G.m.b.H. **841 562**
 Manufacture of hydrocarbon lead compounds by an electrolytic process. Ethyl Corporation. **842 090**
 Methyl and ethyl mercuric 8-hydroxyquinolates and the production thereof. Metalsalts Corp. **841 948**
 Vinyl sulphides of substituted ureas and thioureas and polymers and copolymers thereof. Rohm & Haas Co. **842 091**
 Purification of acrylic and methacrylic esters. Wakefield & Co. Ltd., C. C. **841 522**
 Process for purifying coal distillation gases. Koppers G.m.b.H., H. **841 610**
 Process for the manufacture of elastomeric organo-poly-siloxane products. Wacker-Chemie G.m.b.H. **841 825**
 Manufacture of liquid ethylene polymers. Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius, & Brüning. **841 981**

- Preparation of benzoic acid, from cumene. Imperial Chemical Industries Ltd. **842 142**
 Polyorgano-siloxane-resin compositions. American Cyanamid Co. **841 833**
 Modified polymers of acrylonitrile polymerised in the presence of preformed copolymers. Chemstrand Corporation. **841 830**
 Modification of rubbery copolymers and compounds for use therein. Monsanto Chemical Co. **841 530**
 Manufacture of polyolefins of high molecular weight. Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius & Brüning. **841 982**
 Epsilon-caprolactones and process for preparing same. Union Carbide Corporation, formerly Union Carbide & Carbon Corporation. **841 839**
 Process for the production of epsilon-halocaproic acids. Union Carbide Corporation, formerly Union Carbide & Carbon Corporation. **841 840**
 Production of polymeric materials. British Rubber Producers' Research Association. **842 205**
 Preparation of organic carbamate compounds. Armour & Co. **841 626**
 Substituted mercaptobenzo-thiazoles. Monsanto Chemical Co. **841 688**
 Process for the manufacture of vinylphosphonic acid bis(b-chlorethyl) ester. Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius, & Brüning. **841 886**
 Preparation of bis (hydroxyphenyl) alkyl-methanes. Esso Research & Engineering Co. **842 209**
 Polymerisation of diolefins. Firestone Tire & Rubber Co. **841 691**
 2-Alkyl steroids and process for their preparation. British Drug Houses Ltd. **841 887**
 Purification of aliphatic acids. Celanese Corporation of America. **841 692**
 Crystalline zeolite K-G and process for making same. Union Carbide Corporation, formerly Union Carbide & Carbon Corporation. **841 695**
 Polysocyanate compositions. Imperial Chemical Industries Ltd. **842 154**
 Manufacture of copolymers of oil-modified alkyl resins and vinyl compounds. Imperial Chemical Industries Ltd. **841 700**
 4,4'-Diaminodiphenylsulphoxide derivatives. Imperial Chemical Industries Ltd. **841 701**
 Triphenylmethane derivatives and their use in molluscicidal compositions. Imperial Chemical Industries Ltd. **841 634**
 Polyvinyl chloride stabiliser. Argus Chemical Corporation. **841 890**
 Process for the production of 5-nitro-2-furfuraldehyde semicarbazone. Petroleum & Chemicals Industry, Director of the Roumanian Ministry for. **841 635**
 6-Methyl steroids. British Drug Houses Ltd. **841 870**
 Contact converters for the production of sulphur trioxide. Svenska Maskinverken A.B., and Reymerholms Gamla Industri A.B. **841 636**
 Bis-(S-(2-thio-N-acylimidazalinyl) ethyl) ethers. Rohm & Haas Co. **841 704**
 Catalytic polymerisation of olefins. Esso Research & Engineering Co. **841 638**
 Method for the manufacture of methyl acrylate and methyl methacrylate monomers. Soc. D'Electro-Chimie, D'Electrometallurgie et des Acieries Electriques D'Ugine. **842 025**
 Cyanine dyes. Ilford Ltd. **841 588**
 Catalytic refining of crude benzenes. Still, K. F. [trading as Still, C. (Firm of)]. **841 958**
 Regenerated cellulose structures. Du Pont De Nemours & Co., E. I. **841 708**
 Process for the production of gases containing carbon monoxide and hydrogen. Texaco Development Corporation. **841 709**
 Process for preparing low molecular weight polyolefines. Farbwerke Hoechst A.G. Vorm. Meister, Lucius, & Brüning. **841 898**
 Pharmaceutical compositions comprising ferrocene derivatives. Imperial Chemical Industries Ltd. **841 710**
 Production of catalysts. Monsanto Chemical Co. **841 718**
 6-Methyl steroid compounds. British Drug Houses Ltd. **841 719**
 Process for preparing plasticised mixtures (formulations) of thermoplastic polymers and a product prepared in this manner. Stockholms Superfosfat Fabriks A.B. **841 649**
 Method for removing lactonitrile from aqueous media. Goodrich Co., B. F. **841 906**
 Polyeoxy compounds. General Mills Ltd. **841 589**

- Beneficiation of manganese silicate ores. Mackay, G. P., and Trost, W. R. **841 907**
 Process for regenerating a cuprous ammonium salt solution. Kellogg Co., M. W. **841 965**
 Steroid compounds. Merck & Co. Inc. **841 998**
 Process of making colourless aqueous saline solutions of polyacrylonitrile. Abbey, A. Dow Chemical Co. **841 732**
 2-Piperonyl-propanal, a perfume, and process for making same. Polak & Schwarz International N.V. **841 921**
 Method and apparatus for control of polymerisation reactions. Phillips Petroleum Co. **842 051**
 Process for the preparation of stabilised nitro-cellulose. Instituto Nacional De Industria, Centro de Estudios Tecnicos De Materiales Especiales, and Thoenert, E. **841 738**
 Process for the production of diaryl-carbonates. Farbenfabriken Bayer A.G. **841 654**
 Method of making plastic foam. United States Rubber Co. **841 742**
 Production of aliphatic bromides. Distillers Co. Ltd. **841 745**
 Production of conjugated diolefins. British Hydrocarbon Chemicals Ltd. **841 746, 841 747, 841 748**
 Lignin-modified phenolic resins. Udic S.A. **841 749**
 Process for the production of disperse dyestuffs of the anthraquinone series. Sandoz Ltd. **841 927**
 Monoazo dyestuffs and their cobalt and chromium complex compounds. Sandoz Ltd. **841 930**
 Production of substantially pure thorium and uranium and binary and ternary alloys of thorium, uranium and zirconium. Commonwealth Scientific & Industrial Research Organisation. **841 685**
 Zeolites. Union Carbide Corporation. **841 812**
 Phosphonic acid esters. Farbenfabriken Bayer A.G. **841 671**
 Conversion of α,β -unsaturated aldehydes "to the corresponding alcohols." Nopco Chemical Co. **841 813**
 Polymeric compositions. Goodrich Co., B. F. **841 977**
 Processes for polymerising ethylene with the aid of organo-metallic catalysts. Montecatini Soc. Generale Per L'Industria Mineraria E Chimica. **841 679**
 Process for the manufacture of the lower alkyl esters of unsaturated aliphatic acids. Standard Oil Co. **841 680**
 Softening agents for polymers of vinyl chloride. Chemische Werke Hüls A.G. **841 805**
 Purification of elementary boron. United States Borax & Chemical Corporation. **841 980**
 Preparation and use of haloalkyl esters of terephthalic and isophthalic acids. Du Pont De Nemours & Co., E. I. **842 071**

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A DUST-FREE area for the assembly of the special valves and automatic fluid control equipment under production for "secret work" in the nuclear field has been built at the Rochester factory of the Fisher Governor Co., a member of the Elliott-Automation Group, 34 Portland Place, London W.1.

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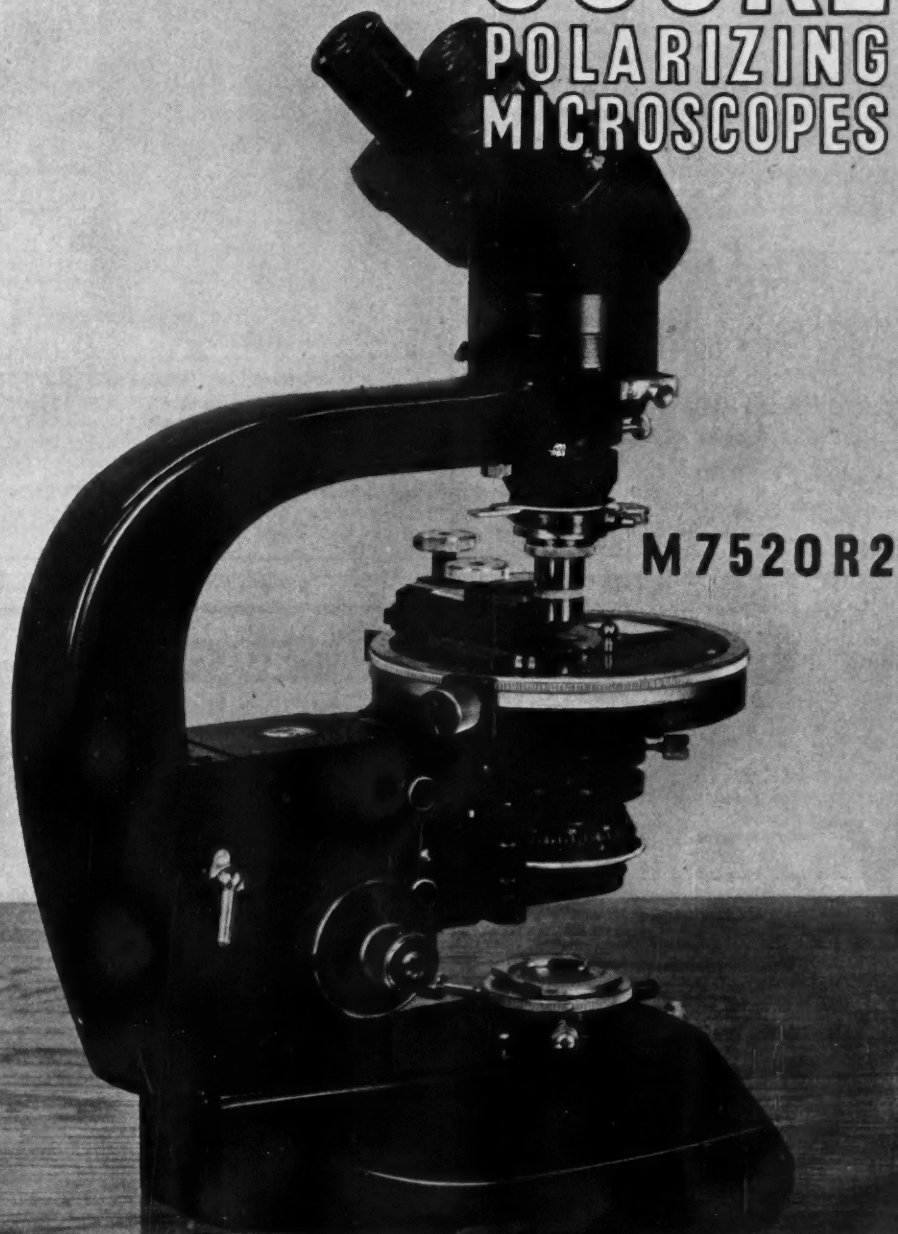
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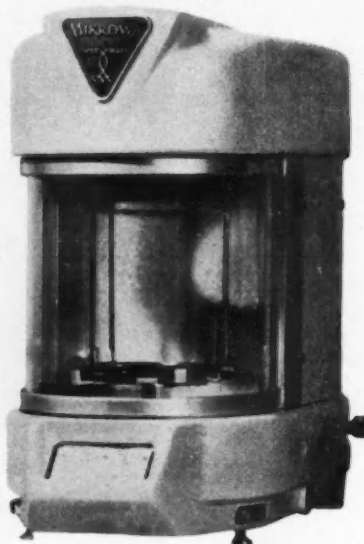


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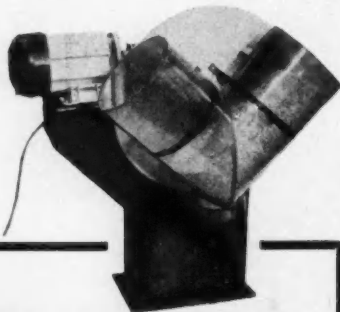
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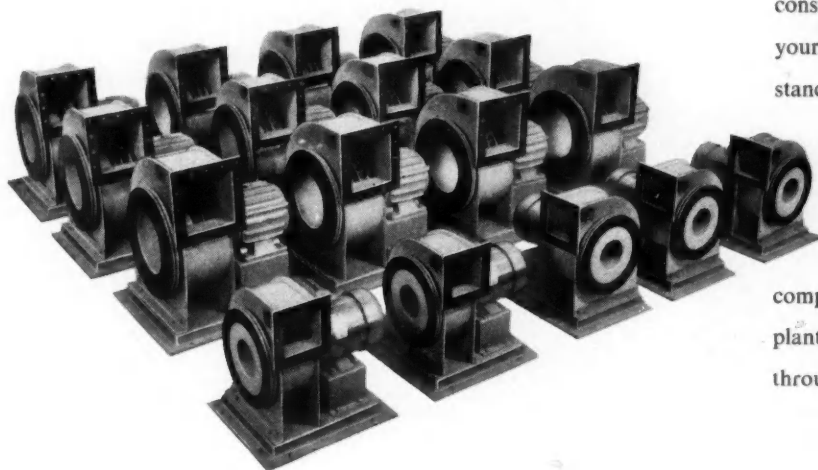
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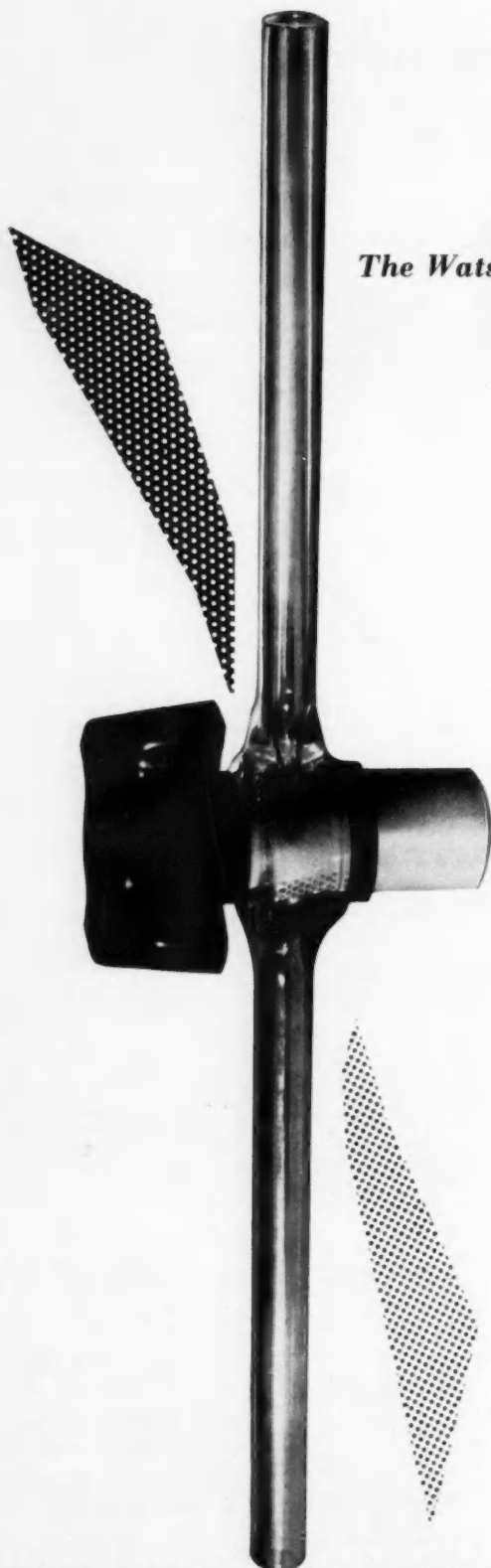


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